

National Compensation Survey (NCS)

**B. Collection of Information Employing Statistical Methods**

**NOTE:** Proposed Changes to the National Compensation Survey

The President's proposed budget for FY 2011 calls for an alternative to the Locality Pay Survey (LPS) component of the National Compensation Survey (NCS), a new approach that uses data from two current BLS programs – the Occupational Employment Statistics (OES) survey and Employment Cost Index (ECI) portion of the NCS. This may allow for the production of additional locality pay data, while still meeting the requirement to provide data to the President's Pay Agent and continuing to produce the other NCS estimates. At the same time, the NCS will implement a new sample design and implement a sample reduction.

Planning for a redesigned NCS is underway. These plans, currently being developed, call for a transition from an area-based survey design to a non-area-based national design, as well as other changes that will better reflect the reduced survey scope. Until the redesign has been fully tested and evaluated, the NCS will continue to select samples using the current design described in Part B. Section B.4.b outlines the primary technical topics, including important notes on data quality, currently being evaluated for the prospective NCS redesign. In addition, Ferguson et al. (2010) provide additional technical detail on the prospective redesign research efforts.

Part A of this package reflects the President's proposed budget in the sample size and respondent burden estimates, outputs, and other aspects of NCS.

Part B of this package reflects the current survey design of the NCS.

**For detailed technical materials on the sample allocation, selection, and estimation methods as well as other related statistical procedures see the BLS Handbook of Methods, BLS technical reports, and ASA papers listed in the references section. The following is a brief summary of the primary statistical features of NCS.**

Prior planning for the NCS involved the consideration of alternative designs within the overall budgetary constraint. Some of the major elements entering into these considerations were the basic products desired, the availability of data, and requirements to assure statistically reliable estimates. Other elements considered were the efficiency of alternative collection procedures and the probable degree of cooperation from respondents.

Current planning for a redesigned NCS is underway. The proposed 2011 budget calls for an alternative to the LPS component of the NCS, which provides occupational wage data by industry and specific geographic areas. As described in Sections 1 – 3 of this document, the NCS sample is selected using a 3-stage stratified design with probability proportional to employment sampling at each stage. The first stage of sample selection is a probability sample of areas, the second stage is a probability sample of establishments within sampled areas, and the third stage of sample selection is a probability sample of jobs within sampled areas and establishments. During the selection of establishments, approximately one-half of the establishments, the index portion, are sub-sampled and flagged to support the ECI, ECEC, and NCS Benefits products. The remaining establishments, the wage-only portion, are flagged to support the wage products only. Data from all sampled establishments, both the wage-only portion and the index portion, are used to produce the wage products.

Until the budget change is approved, NCS will continue to select samples using the methodology described in this document. Additionally, NCS will continue to collect data from all establishments selected in the sample to support all the NCS outputs. When the budget is approved to implement the alternative approach, BLS will stop collecting data from the wage-only establishments in the NCS sample. As soon as feasible after the budget implementation, BLS will revert to a national design in order to preserve the reliability of the ECI and EBS. With a national design, the BLS will reduce the sample size of the ECI and EBS by about 25 percent. Section 4.b of this document describes the current efforts to develop and test the proposed new sample design.

### **1a. Universe**

The NCS measures employee compensation in the form of wages and benefits for detailed geographic areas, industries, and occupations as well as national level estimates by industry and occupation. The universe for this survey consists of the Quarterly Contribution Reports (QCR) filed by employers subject to State Unemployment Insurance (UI) laws. The BLS receives these QCR for the Quarterly Census of Employment and Wages (QCEW) Program from the 50 States, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. The QCEW data, which are compiled for each calendar quarter, provide a comprehensive business name and address file with employment, wage, detailed geography (i.e., county), and industry information at the six-digit North American Industry Classification System (NAICS) level. This information is provided for over eight million business establishments of which about six million are in the scope of this survey.

The potential respondent universe used in the selection of the NCS sample of establishments is derived from the QCEW and a supplementary file of railroads for each area in the sample. The QCEW is created from State Unemployment Insurance (UI) files of establishments, which are obtained through the cooperation of the individual State agencies. UI accounts are assigned to all employers in the United States who are required to pay for unemployment insurance. The NCS universe includes all State and local governments and private sector industries, except for agriculture, forestry, and fishing (NAICS Sector 11) and private households (NAICS Subsector 814). Estimates of the current universe and sample size of all areas in the sample are about 6,000,000 and 31,700 establishments, respectively. Data on

the duties and responsibilities of a sample of jobs will be collected in all sample establishments.

Among NCS's projected 31,700 sample establishments, which include the Locality Pay Survey, approximately 15,400 establishments will have quarterly collection for the employment costs and benefits participation and plan provisions. The approximately 16,300 remaining establishments will have annual collection of earnings data to produce locality and national data.

When NCS implements an alternative to the LPS component of the NCS as described elsewhere in this document, NCS will reduce the size of the sample with quarterly collection by approximately 25% from the current 15,400 establishments to 11,400 establishments. In addition, NCS will stop collecting earnings data from the 16,300 remaining establishments. The burden estimates in Part A reflect these reduced collection efforts.

## **1b. Sample**

### Stratification and Sample Selection

The NCS sample is selected using a 3-stage stratified design with probability proportional to employment sampling at each stage. The first stage of sample selection is a probability sample of areas, the second stage is a probability sample of establishments within sampled areas, and the third stage of sample selection is a probability sample of jobs within sampled areas and establishments. For more information on the sample design, see the Bureau of Labor Statistics Handbook of Methods, Chapter 8, at the following website, <http://www.bls.gov/opub/hom/pdf/homch8.pdf>.

The selection of sample areas is done by first dividing the entire area of the United States, consisting of counties (or county equivalents such as parishes in Louisiana) and independent cities, into primary sampling units (PSUs). In most States, a PSU consists of a county or a number of contiguous counties. Metropolitan and micropolitan areas, as defined by OMB, are used as a basis for forming PSUs. Outside of metropolitan and micropolitan areas, a cluster of contiguous counties defines a PSU.

The PSUs with similar average earnings are grouped into strata within each of the 9 Census divisions and three area types (Metropolitan, Micropolitan, outside of metropolitan and micropolitan). One PSU is selected from each stratum with the probability of selection proportional to the employment of the PSU. There are 57 PSUs in strata by themselves that are self-representing, and these include the 27 Combined Statistical Areas (CSAs), the 29 largest Metropolitan Statistical Areas (MSAs), and 1 additional metropolitan area needed to meet the needs of the Pay Agent. The remaining strata are formed by combining PSUs that are MSAs and have similar average annual pay into 60 MSA strata, PSUs that are Micropolitan areas and have similar annual average pay into 22 Micropolitan strata, and PSUs that are outside of metropolitan and micropolitan areas and have similar average annual pay into 13 strata. The PSUs selected with probability proportionate to PSU

employment from these strata are non-self-representing because each one chosen represents the entire stratum.

The NCS program started transitioning to the Metropolitan Statistical Areas, Metropolitan Divisions, Micropolitan Statistical Areas, and Combined Statistical Areas in the United States based on the standards published in December 2003, in the Federal Register (65 FR 82228 - 82238) in FY 2007. Current lists of the December 2003 version of the Metropolitan and Micropolitan Statistical Areas and definitions are at this link:  
<http://www.census.gov/population/www/estimates/metrodef.html>

Each sample of establishments is drawn by first stratifying the sampling frame for each PSU by industry and ownership. The strata for private industry, local government, and State government (North American Industry Classification System -- NAICS based) are as follows:

**NCS Stratification**

<u>Private Industry</u> NAICS	Industry Cell Code	Industry
21	21A	Mining
22	22A	Utilities
23	23A	Construction
31-33 (excl 336411)	31A	Manufacturing
336411	*	Aircraft Manufacturing
42	42A	Wholesale Trade
44-45	44A	Retail Trade (rest of)
48-49	48A	Transportation and Warehousing
51	51A	Information (rest of)
52 (excl 524)	52A	Finance (excluding Insurance)
524	52B	Insurance Carriers and Related
Activities		
53	53A	Real Estate and Rental and Leasing
54	54A	Professional, Scientific, and Tech
Services		
55	55A	Management of Companies and
Enterprises		
56	56A	Admin and Support, Waste
Management		
61(excl 6111-61130)	61A	Education (rest of)
6111	61B	Elementary & Secondary Education
6112, 6113	61C	Colleges & Universities
62 (excl 622,623)	62A	Health and Social Assistance (rest of)
622	62B	Hospitals
623	62C	Nursing Homes
71	71A	Arts, Entertainment, and Recreation
72	72A	Accommodation and Food Services

81(excl 814)  
administration

81A

Other services except public

\*Aircraft Mfg is not included in the overall stratification and allocation of the NCS sample. This sample is handled separately in order to provide estimates to the industry.

### Local Government

<b>NAICS</b>	<b>Industry Cell Code</b>	<b>Industry</b>
21, 23, 31-33	10L	Mining, Constr, Goods-Producing
42, 44-45, 48-49, 22	20L	Trade, Transportation, and Utilities
6111	30L	Elementary & Secondary Education
6112, 6113	40L	Colleges and Universities
61 excl. 6111-6113	50L	Rest of Education
622	60L	Hospitals
623	70L	Nursing Homes
62 excl. 622-623	80L	Rest of Health and Social Services
92 excl. 928	90L	Public Administration
51, 52-53, 54-56, 71-72, 81 excl 814	99L	Other Service -producing

### State Government

<b>NAICS</b>	<b>Industry Cell Code</b>	<b>Industry</b>
21, 23, 31-33	10S	Mining, Constr, Goods-Producing
42, 44-45, 48-49, 22	20S	Trade, Transportation, and Utilities
6111	30S	Elementary & Secondary Education
6112, 6113	40S	Colleges and Universities
61 excl. 6111-6113	50S	Rest of Education
622	60S	Hospitals
623	70S	Nursing Homes
62 excl. 622-623	80S	Rest of Health and Social Services
92 excl. 928	90S	Public Administration
51, 52-53, 54-56, 71-72, 81 excl 814	99S	Other Service –producing

The number of sample establishments allocated to each stratum is approximately proportional to the stratum employment. Each sampled establishment is selected within a stratum with a probability proportional to its employment. Following the initial allocation and selection of the wage sample, the index, or wage and benefit sample is allocated and selected. The index sample is a subsample of the wage sample. The index sample is roughly half the wage sample. Establishments in the wage sample that are not also included in the index sample are called wage-only units. The details of the allocation process used in the NCS are documented in the 2005 ASA Proceedings of the Survey Research Methods Section<sup>1</sup>.

After the sample of establishments is drawn, jobs are selected in each sampled establishment. The number of jobs selected in an establishment ranges from 4 to 8 depending on the total number of employees in the establishment, except for government

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<sup>1</sup> Yoel Izsak, Lawrence R. Ernst, Erin McNulty, Steven P. Paben, Chester H. Ponikowski, Glenn Springer, Jason Tehonica, "Update on the Redesign of the National Compensation Survey", 2005 Proceedings of the American Statistical Association, Section on Survey Methods Research [CD-ROM], American Statistical Association, 2005 <http://www.bls.gov/ore/pdf/st050140.pdf>>

and aircraft manufacturing units and units with less than 4 workers. In governments, the number of jobs selected ranges from 4 to 20. In aircraft manufacturing, the number of jobs selected ranges from 4 for establishments with less than 50 workers to 32 for establishments with 10,000 or more workers. In establishments with less than 4 workers, the number of jobs selected equals the number of workers. The probability of a job being selected is proportionate to its employment within the establishment.

*Scope*—The NCS sample is selected from the populations as defined above.

*Stratification*—The NCS sample, including the LPS, has 31,700 establishments allocated based on the stratification of ownership (private, state government, local government), nine Census divisions, 24 industries for private, and 10 industries for state and local government. Self-representing, certainty establishments are assigned a sampling weight of 1.00 and non-certainty establishments are assigned a sampling weight equal to the inverse of their selection probability. Establishment counts for the sample, by area and ownership, are shown in Appendix A. In-scope private employment and establishment counts for the NCS Survey Areas are summarized by geographic area in Appendix A.

## **2a. Sample Design**

*Allocation method*—The current NCS sample, which includes the LPS is a stratified probability-proportional-to-size systematic random sample. The basic sampling unit is an establishment or worksite. Sampled state and local government units, as well as aerospace units, generally remain in the survey for 11 years. Private units remain in the survey for 6 years. The characteristics used to stratify the establishment sample are geographic area by nine Census divisions, and industry divisions defined primarily by 2-digit NAICS (see Section 1b. for strata definitions and Appendix A for establishment allocation).

NCS characteristics are highly correlated with an establishment's geographic area, industry and employment level. Thus for a fixed sample size, stratified sampling results in a greater precision than simple random sampling. Some establishments are included in the sample with certainty.

*Sample Rotation*—See the section on Panel Structure in the BLS Handbook of Methods listed in the references (Section 6).

### Sample Replacement Scheme

NCS, which currently includes the LPS, selects a new sample of areas approximately once every ten years. The current sample of areas was selected from areas that were defined by OMB after the 2000 Census. In 2004, NCS selected a new sample of areas from areas that were based on the 2000 Census. Each year, NCS selects a new sample of establishments from the most recent available frame data. Private industry establishments from the old area sample are rotated out of the NCS survey outputs over a period of approximately 6 years as the new area private industry establishment samples are rotated into the survey outputs. Beginning in 2006, a new sample of State and local government establishments was selected and was introduced into NCS at the end of 2007. The State and local government

establishments will remain in the sample at least 11 years. A new sample of jobs is selected within each private establishment at least once every 6 years (11 years for government) as the establishment is initiated into the survey process. Under this scheme the entire private NCS sample is completely replaced every 6 years.

The primary objectives of the replacement scheme are to reduce reporting burden of individual establishments by rotating units out of the sample and to insure that the establishment sample is representative of the universe it is designed to cover over time.

Appendix B provides an overview of the NCS sample replacement scheme.

*Research on sample issues*—As mentioned in the introduction, proposed NCS 2011 budget levels may require the NCS to move from an area-based design to a non-area-based national design. Research is underway to explore alternative sample designs. See Section 4.b for more details.

## **2b. Estimation Procedure**

The survey produces level estimates, such as average earnings of professional workers at the entry level, along with quartiles, first and last deciles, and indexes. The estimation procedures for the earnings and index estimates are described below. The Index procedure also includes seasonal adjustment. Note that both of these procedures involve weighting the data from each employee in the sampled job by the final weight.

The final weights include the initial sample weights, adjustments to the initial sample weights, two types of adjustments for non-response, and benchmarking. The initial sample weight for a job in a particular establishment and PSU reflects the probability of selecting a particular PSU, the probability of selecting a particular establishment within the PSU, and the probability of selecting a particular job within the selected establishment and PSU. Adjustments to the initial weights are done when data are collected for more or less than the sampled establishment. This may be due to establishment mergers or splits or the inability of respondents to provide the requested data for the sampled establishment. The two types of adjustments for non-response include adjustment for establishment refusal to participate in the survey and adjustment for respondent refusal to provide data for a particular job.

Benchmarking or post-stratification is the process of adjusting the weight of each establishment in the survey to match the distribution of employment by industry at the reference period. Because the sample of establishments used to collect NCS data was chosen over the past several years, establishment weights reflect their employment when selected. For outputs other than the ECI, the benchmark process updates that weight based on current employment. For the ECI, the benchmark process updates that weight based on the employment during the publication base period. For more details about the NCS benchmarking procedures see the BLS Handbook listed in the references below (Section 6).

The estimation procedure for level estimates, such as mean weekly earnings, mean annual wages, and mean hourly earnings, use the individual weight, which is the product of the



weights, as described in the paragraph above, of the sampled job, the individual rates in the sampled job, and the number of weeks worked per year. The calculation of the mean hourly earnings includes, in addition to the individual weight, individual wage rate, and number of weeks worked per year, the number of hours paid per week according to the employee's standard work schedule. For mean weekly earnings this involves multiplying the weekly wage rate for each employee in the sample job by the final weight and the number of annual weeks worked, summing, and dividing by the sum of the final weights times the number of workers for which the NCS collected data times the number of weeks worked. See Chapter 8 of the BLS Handbook of Methods (available on the BLS Internet at <http://www.bls.gov/opub/hom/pdf/homch8.pdf>) for an explanation of the estimation procedures for Employer Costs for Employee Compensation estimates and for Benefit Incidence and Provisions estimates.

The index computation involves the standard formula for Laspeyres fixed-employment-weighted index, modified by the special statistical conditions that apply to the NCS. An index for a benefit derived from the NCS data is simply a weighted average of the cumulative average benefit costs changes within each estimation cell, with base-period benefit bills as the fixed weights for each cell. This discussion focuses on the ECI measures of benefit cost changes, but indexes of changes in compensation and wages are computed in essentially the same fashion.

The simplified formula is:

$$\text{Numerator} = \frac{N = \sum_i W_{0i} M_{ti}}{D = \sum_i W_{0i}}$$

$$\text{Denominator} = I_t = 100(N/D)$$

where:

i = estimation cell

t = time

$I_t$  is the index at time t

$W_{0i}$  is the estimated base-period benefit bill for the  $i^{\text{th}}$  estimation cell. The benefit bill is the average benefit cost of workers in the cell times the number of workers represented by the cell.

$M_{ti} = M_{(t-1)i} R_{ti}$  is the cumulative average benefit cost change in the  $i^{\text{th}}$  estimation cell from time 0 (base period) to time t (current quarter).

$M_{(t-1)i}$  is the cumulative average benefit cost change in the  $i^{\text{th}}$  estimation cell from time 0 (base period) to time t-1 (prior quarter).

$R_{ti}$  is the ratio of the current quarter weighted average benefit cost in the cell to the prior quarter weighted average benefit cost in the cell, both calculated in the current quarter using matched establishment/occupation observations.

The estimation cell is defined on the basis of ownership/industry/major occupation group. For the public sector, separate cells are identified for State and for local governments. Industries as broad as “public administration” and as narrow as “colleges and universities” are treated as separate estimation cell industries. For example, one estimation cell is identified as State government/public administration/clerical workers.

The index computations for the occupation and industry groups follow the same procedures as those for all overall indexes except for the summation. The bills for the occupational groups are summed across industries for each group; the bills for the industry divisions are summed across occupational groups for each industry division.

Computational procedures for the regional, union/nonunion, and metropolitan/non-metropolitan measures of change differ from those of the “national” indexes because the current sample is not large enough to hold constant the benefits bills at the level of detail. For these “non-national” series, each quarter the prevailing distribution in the sample between, for example, union and nonunion within each industry/occupation cell, is used to apportion the prior quarter benefits bill in that cell between the union and nonunion series. The portion of the benefits bill assigned to the union sector is then moved by the percentage

change in the union earnings in the cell, and similarly for the nonunion sector. Thus, the relative importance of the union sector in each cell is not held constant over time. Since the relative weights of the region, the union, and the metropolitan area sub-cells are allowed to vary over time, the non-national series are not fixed base period Laspeyres indexes; rather, these are similar to chain linked Laspeyres indexes.

### Seasonal Adjustment

Current seasonally adjusted estimates are published in the ECI News Release and historical listing. Each year at the end of the December ECI quarterly production, seasonal adjustment revision is conducted, including revisions to seasonal factors and revisions to historical indexes and 3-month percent changes for the past 5 years. Due to seasonal adjustment revision, the set of published seasonally adjusted series is subject to change each year, as series that are not seasonal are not shown in the seasonally adjusted estimate tables and series that are newly seasonal are added to the tables. Seasonal factors for the coming year are posted on the BLS website at <http://www.bls.gov/ncs/ect/ectsfact.htm>. Revisions of historical seasonally adjusted data for the most recent five years also appear within the article referenced by the website.

The ECI series are seasonally adjusted using either the direct or indirect seasonal adjustment method. Indexes at comparatively low levels of aggregation, such as the construction wage index, are adjusted by the direct method; that is, dividing the index by its seasonal factor. Seasonal factors are derived using X-12 ARIMA (Auto-Regressive Integrated Moving Average), a seasonal adjustment program developed by the Census Bureau, as an extension of the standard X-11 method. For more information on X-12 ARIMA see the Census website at <http://www.census.gov/srd/www/x12a/>. Most higher level aggregate indexes are seasonally adjusted by the indirect method, a weighted sum of seasonally adjusted component indexes, where the weights sum to 1.0. For example, the civilian, state and local governments, private industry, goods producing, manufacturing, and service providing series are derived by the indirect seasonal adjustment method.

For more details about the NCS seasonal adjustment procedures see the BLS Handbook listed in the references below (Section 6).

### **2c. Reliability**

The estimation of sample variances for the NCS survey is accomplished through the method of Balanced Half Samples (BHS). This replication technique uses half samples of the original sample and calculates estimates using those sub samples. The replicates weights in both half-samples are modified using Fay's method of perturbation. The sample variance is calculated by measuring the variability of the estimates made from these sub samples. For a detailed mathematical presentation of this method, see the BLS Handbook of Methods listed in the references.

Before estimates of these characteristics are released to the public, they are first screened to ensure that they do not violate the Bureau of Labor Statistics' (BLS) confidentiality pledge. A promise is made by the Bureau to each respondent that BLS will not release its reported

data to the public in a manner which would allow others to identify the establishment, firm, or enterprise. Wage estimates which fail confidentiality screening based on p-percent rule for disclosure (see Federal Committee on Statistical Methodology Working paper 22) are not published. Other statistical procedures are used to determine the disclosure limitations of other estimates.

### Measuring the Quality of the Estimates

The two basic sources of error in the estimates are bias and variance. Bias is the amount by which estimates systematically do not reflect the characteristics of the entire population. Many of the components of bias can be categorized as either response or non-response bias.

Response bias occurs when respondents' answers systematically differ, in the same direction, from the correct values. For example, this occurs when respondents incorrectly indicate no change in benefits costs when benefits costs actually increased. Another possibility of having response bias is when data are collected for a unit other than the sampled unit. Response bias can be measured by using a re-interview survey. Properly designed and implemented, this can also indicate where improvements are needed and how to make these improvements. The NCS has a Technical Re-interview Program (TRP) that does a records check of a sample of each field economist's schedules of collected data. TRP is a part of the overall review process. TRP verifies directly with respondents a sample of elements originally collected by the field economist. The results are reviewed for adherence to NCS collection procedures. Although not explicitly used to measure bias, this program allows the NCS to identify procedures that are being misunderstood and to make improvements in the NCS Data Collection Manual and training program.

Non-response bias is the amount by which estimates obtained do not properly reflect the characteristics of non-respondents. This bias occurs when non-responding establishments have earnings and benefit levels and movements that are different from those of responding establishments. Non-response bias is being addressed by continuous efforts to reduce the amount of non-response. NCS is analyzing the extent of non-response bias using administrative data from the survey frame. The results from initial analysis are documented in the 2006 ASA Proceedings of Survey Research Methods Section<sup>1</sup>. A follow-up study from 2008 is also listed in the references. Details, regarding adjustment for nonresponse, are provided in Section 3 below.

Another source of error in the estimates is sampling variance. Sampling variance is a measure of the fluctuation between estimates from different samples using the same sample design. Sampling variance in the NCS is calculated using a technique called balanced half-sample replication. For national estimates this is done by forming 128 different re-groupings of half of the sample units. For each half-sample, a "replicate" estimate is

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<sup>1</sup> Ponikowski, Chester H. and McNulty, Erin E., " Use of Administrative Data to Explore Effect of Establishment Nonresponse Adjustment on the National Compensation Survey", 2006 Proceedings of the American Statistical Association, Section on Survey Methods Research [CD-ROM], American Statistical Association, 2006  
<http://www.bls.gov/ore/abstract/st/st060050.htm>

computed with the same formula as the regular or "full-sample" estimate, except that the final weights are adjusted. If a unit is in the half-sample, its weight is multiplied by  $(2-k)$ ; if not, its weight is multiplied by  $k$ . For all NCS publications,  $k = 0.5$ , so the multipliers are 1.5 and 0.5. Sampling variance computed using this approach is the sum of the squared difference between each replicate estimate and the full sample estimate averaged over the number of replicates and adjusted by the factor of  $1/(1-k)^2$  to account for the adjustment to the final weights. For more details, see the NCS Chapter of the BLS Handbook of Methods. Standard error, which is the square root of variance, for primary aggregate estimates of the index of quarterly change are typically less than 0.5 percent. Relative standard error, which is the square root of variance divided by the estimate, for aggregate estimates of compensation, wage, or benefit levels are typically less than 5 percent. The standard errors or relative standard errors are included within published NCS reports at the following website: <http://www.bls.gov/ncs/ect/ectvar.htm>.

Variance estimation also serves another purpose. It identifies industries and occupations that contribute substantial portions of the sampling variance. Allocating more sample units to these domains often improves the efficiency of the sample. These variances will be considered in allocation and selection of the future replacement samples.

## **2d. Data Collection Cycles**

NCS data are collected quarterly for index schedules and annually for wage schedules.

## **3. Non-response**

There are three types of non-response: permanent non-response, temporary non-response, and partial non-response. The non-responses can occur at the establishment level, occupation level, or benefit item level. The assumption for all non-response adjustments is that non-respondents are similar to respondents.

To adjust for permanent establishment or occupation non-response at the initial interview, weights of responding units or occupations that are deemed to be similar are adjusted appropriately. Establishments are considered similar if they are in the same ownership and 2-digit NAICS. If there are no sufficient data at this level, then a broader level of aggregation is considered.

For temporary and partial non-response, a replacement value is imputed based on information provided by establishments with similar characteristics. Imputation is done separately for each benefit both in the initial period and in subsequent update periods. Imputation is also done for each missing wage estimate after the initial period. In the rare event that the BLS cannot determine whether or not a benefit practice exists for a non-respondent, the average cost is imputed based on data from all responding establishments (including those with no plans and plans with zero costs).

There is a continuous effort to maximize response rates. We are developing and providing respondents with new and useful products. Examples include the Program Perspectives Publications (<http://www.bls.gov/opus/perspectives/>) and plans to provide industry briefs to

field economists to help them identify industry-specific collection challenges. We are continually exploring alternative methods for respondents to report their data. Research is currently underway to provide respondents with web-based methods for providing compensation data.

The response rate, based on weighted employment, is expected to be about 78 percent for earnings only initiation schedules and 74 percent for earnings and benefits initiation schedules. Response rates, based on weighted employment, for update of earnings only schedules among schedules that responded at initiation is estimated at 93 percent, and 90 percent for earnings and benefits update schedules.

### **3a. Maximize Response Rates**

To maximize the response rate for this survey, interviewers initially refine addresses ensuring appropriate contact with the employer. Then, employers are mailed a letter explaining the importance of the survey and the need for voluntary cooperation, and pledging confidentiality. An interviewer calls the establishment after the package is sent and attempts to enroll them into the survey. Non-respondents and establishments that are reluctant to participate are re-contacted by an interviewer especially trained in refusal aversion and conversion. Additionally, respondents are offered a variety of methods, including telephone, fax, email, and internet, by which they can provide data.

### **3b. Non Response Adjustment**

As with other surveys, NCS experiences a certain level of non-response. To adjust for the non-responses, NCS has divided the non response into two groups, 1) unit non-respondents and 2) item non-response. Unit non-respondents are the establishments who do not report any compensation data and item non-respondents are the establishments who report only a portion of the requested compensation data, for example, wages for a subset of sampled jobs.

The unit non-response is treated using a Non Response Adjustment Factor (NRAF) as explained in the estimation procedure section of this document and item non-response is adjusted using item imputation. Within each sampling cell, NRAFs are calculated each year based on the ratio of the number of viable establishments to the number of usable respondents in that month. The details regarding the NRAF procedure are given in the Bureau of Labor Statistics' Handbook of Methods, Chapter 8 (see <http://www.bls.gov/opub/hom/pdf/homch8.pdf>).

The method used for item imputation for wage estimates is a cell-mean-weighted procedure. Details of this procedure are available in BLS Handbook of Methods (<http://www.bls.gov/opub/hom/pdf/homch8.pdf>). Other imputation techniques are used for benefit estimates and are described in the following CWC article: Recent Modifications of Imputation Methods for National Compensation Survey Benefits Data, found at the following link: <http://www.bls.gov/opub/cwc/cm20090825ar01p1.htm>.

### **3c. Non-Response Bias Research**

Recently, extensive research was done to assess whether the non-respondents to the NCS survey differ systematically in some important respect from the respondents of the survey and would thus bias NCS estimates. Details of this study are described in the two papers referenced in Section 2c, by Ponikowski, McNulty, and Crockett, and listed in the references below.

## **4. Testing Procedures**

### **4a. Tests of Collection Procedures**

The NCS has developed and is testing a set of new Web pages based on its data collection system. Implementation of the new pages will follow successful testing by the BLS Cognitive Laboratory, both in the laboratory and then in the field. Respondent access to these new web pages will be through our existing IDCF system.

Through environmental scanning, NCS has identified Payroll Deduction IRA plans as an upcoming compensation trend. NCS plans to add this as a subcategory of the currently collected Cash or Deferred Arrangements (CODAs) with no employer contributions and measure access to the new benefit. This collection will contain yes/no/not determinable questions on whether an establishment offers the new benefit. Our research has shown that staff understand the new benefit and its relationship to the existing benefit-- Cash or Deferred Arrangements (CODAs) with no employer contributions.

A nonsubstantive change will be submitted to OMB for both the Web pages and the new subcategory of the currently collected cash or Deferred Arrangements (CODAs) when testing is complete.

### **4b. Tests of Survey Design Procedures**

As mentioned previously, the President's proposed budget for FY 2011 calls for an alternative to the LPS component of the NCS, a new approach that uses data from two current BLS programs – the OES Survey and ECI. This may allow for the production of additional locality pay data, while still meeting the requirement to provide data to the President's Pay Agent and to produce the other NCS estimates. If this change is approved for implementation, the NCS will need to be redesigned. Planning for a redesigned NCS is underway. These plans, currently being developed, call for a transition from an area-based survey design to a non-area-based national design, a reduction in sample size of approximately 25%, and a move from a 5-year rotation cycle to a 3-year rotation cycle. At the same time, NCS will implement a model-based estimation approach to produce data for the President's Pay Agent. NCS may also implement a model-based estimation approach that would allow BLS to continue to produce wage estimates by worker characteristic such

as full-time vs. part-time or union vs. non-union. NCS is currently evaluating and testing alternatives for this change in three separate sets of activities.

First, the BLS staff is examining potential changes to the NCS sample design that include the following options:

- Moving from an area-based sample design to a national design, thus eliminating the first stage of sampling to select areas
- Implementing a new allocation methodology to correspond with the non-area-based sampling
- Moving from a five-year rotation to a three-year rotation for private industry establishments
- Moving from a design that includes multi-year certainty establishments to a design that controls the number of times each establishment can appear in a 3-year rotation. One option being explored is called dependent sampling.

For each of these options, NCS is testing the proposed change using the general scheme described below.

- Obtain a full frame of data,
- Use establishment total wage data from the frame to compute average monthly wages across all establishments,
- Implement the proposed change using the full frame of data,
- Select multiple (100 or more) simulated samples using the proposed methodology,
- Compute estimates of the average monthly wages using the weighted data from each of the simulated samples,
- Compute the mean and standard error of the average monthly wages across all the simulated samples, and
- Compare the estimated average monthly wages across the simulated samples to those from the frame.

In addition to analyzing the potential effect of the redesign on the reliability of the estimates, we are also studying the effect of any redesign on response rates and bias.

Based on prior experience and a preliminary analysis of the proposed design changes, we believe that the ECI, ECEC, and incidence and key provisions benefits products from the NCS will be of about the same quality as the current estimates. We also believe that we will be able to continue publishing most, if not all, of the current detailed estimates for these product lines. Estimates in the NCS detailed benefits product line are produced from the current initiation sample only. Due to a move to a three-year rotation, each initiation sample will be larger than the current five-year rotation sample even though NCS will implement a sample reduction. The larger sample that will be used to produce the detailed benefits provisions products will hopefully result in some increased accuracy for these estimates, although further evaluation of this is still underway.

Results of these tests will be used to determine which changes will be made to the sample design. Until the proposed budget changes are implemented, testing is complete, specific



changes are identified, and the modified design is approved by OMB, NCS will continue to use the sample design and rotation strategy described earlier in this document.

Second, the BLS staff explored and evaluated different model-based approaches that use data from the OES survey and the Employment Cost Index portion of the NCS to produce data for the President's Pay Agent. Multiple models were proposed and evaluated using data from recent samples. The proposed models and resulting evaluations are documented in the report titled "Using OES Data in Federal Pay Comparability: A Regression-Based Approach" which was shared with the Office of Personnel Management (OPM) during a meeting on April 15, 2009. A copy of this report is attached to this document (see Attachment C).

As described in Attachment C, the BLS would introduce a new model-based approach that uses data from two current BLS programs – the Occupational Employment Statistics (OES) survey and ECI, another component of the NCS. In the proposed approach, OES data would provide wage data by occupation and by area, while NCS data would be used to specify grade level effects. Since the OES sample is much larger than the NCS sample, the BLS would expect, overall, efficiency gains in the estimates of mean wages by occupation and area. The model-based approach also could be used to extend the estimation of pay gaps to areas that are not present in the NCS sample. This approach also would allow the BLS to eliminate the LPS component of the NCS, resulting in cost savings.

The model-based approach was presented to the Office of Personnel Management (OPM) in April 2009. During the discussion, OPM indicated that the overall results of this approach appeared to provide high quality data that would meet the requirements of the President's Pay Agent. Moreover, OPM was receptive to the availability of data for additional locality areas. However, OPM did express some concern that the estimates were using data, from the OES, that are collected without regard to work level, a key component of the pay comparison process since the 1960s and a characteristic specified in FEPCA. The discussion with OPM also highlighted the challenges inherent with presenting this approach to the various stakeholders of Federal locality pay setting.

As documented in Attachment C, BLS has evaluated standard errors associated with the current model used to provide data to the President's Pay Agent and the proposed model using data from NCS and OES. Based on this analysis, for the geographic areas where NCS has data, the proposed regression method appears to be capable of estimating pay gaps with greater precision (lower variance) than does the current approach. However, in studies of small domain estimation over the past thirty years, the predominant practical issues with data quality have involved conditional and unconditional bias, and not variance as such. These bias issues tend to arise from lack of fit in the models employed with these estimators for some domains. Evaluation of these bias issues will require extensive empirical evaluation, and empirical results on bias may vary substantially across time and across the factors used to define the domains of interest. BLS has not completed any bias studies for either the current model or the proposed model and is unable to say whether the new model will change any bias in the modeled estimates.

Third, BLS staff is evaluating alternative model-based approaches for using data from the OES survey and the NCS to produce occupational based wage estimates by worker characteristics such as full-time/part-time status and work level. Although BLS is not mandated to publish specific wage estimates by worker characteristics, appropriate models may be developed that would allow the continued publication of these estimates. The current evaluation of the proposed models includes an analysis of mean squared error and a comparison of the various models using inclusion probabilities comparing the values produced by various potential estimators to data produced using only NCS data. This work is still in progress.

## 5. Statistical and Analytical Responsibility

Ms. Gwyn Ferguson, Chief, Statistical Methods Group of the Office of Compensation and Working Conditions is responsible for the statistical aspects of the NCS program. Ms. Ferguson can be reached on 202-691-6941. As mentioned in the above paragraph, BLS seeks consultation with other outside experts on an as needed basis.

## 6. References

Bureau of Labor Statistics' Handbook of Methods, Chapter 8, Bureau of Labor Statistics, 2010 [http://www.bls.gov/opub/hom/homch8\\_a.htm#background](http://www.bls.gov/opub/hom/homch8_a.htm#background)

Lawrence R. Ernst, Christopher J. Guciardo, Chester H. Ponikowski, and Jason Tehonica, (August 2002), "SAMPLE ALLOCATION AND SELECTION FOR THE NATIONAL COMPENSATION SURVEY," ASA Papers and Proceedings, <http://www.bls.gov/osmr/pdf/st020150.pdf>

Yoel Izsak, Lawrence R. Ernst, Erin McNulty, Steven P. Paben, Chester H. Ponikowski, Glenn Springer, Jason Tehonica, (August 2005), "UPDATE ON THE REDESIGN OF THE NATIONAL COMPENSATION SURVEY," ASA Papers and Proceedings, <http://www.bls.gov/osmr/pdf/st050140.pdf>

Chester H. Ponikowski and Erin E. McNulty, (December 2006), "USE OF ADMINISTRATIVE DATA TO EXPLORE EFFECT OF ESTABLISHMENT NONRESPONSE ADJUSTMENT ON THE NATIONAL COMPENSATION SURVEY ESTIMATES," ASA Papers and Proceedings, <http://www.bls.gov/osmr/pdf/st060050.pdf>

Erin McNulty, Chester H. Ponikowski, Jackson Crockett, (October 2008), "Update on Use of Administrative Data to Explore Effect of Establishment Non-response Adjustment on the National Compensation Survey Estimates," ASA Papers and Proceedings, <http://www.bls.gov/osmr/pdf/st080190.pdf>

Cochran, William, G., (1977), Sampling Techniques 3<sup>rd</sup> Ed., New York, Wiley and Sons, 98, 259-261.

Federal Committee on Statistical Methodology, Subcommittee on Disclosure Limitation Methodology, "Statistical Policy Working Paper 22," [http://www.fcsm.gov/working-papers/SPWP22\\_rev.pdf](http://www.fcsm.gov/working-papers/SPWP22_rev.pdf)

Matt Dey, Maury Gittleman, Mike Lettau, Steve Miller, (March 2009), "Using OES Data in Federal Pay Comparability: A Regression-Based Approach," (See Attachment C).

Gwyn Ferguson, Chester Ponikowski, Joan Coleman, (August 2010), "Evaluating Sample Design Issues in the National Compensation Survey," ASA Papers and Proceedings, (See Attachment D).

**Appendix A: Allocation of NCS Establishment Sample by Survey Area and Ownership, followed by Private Industry In-Scope Emp & Estabs by Survey Area (see below). Please note, total allocated sample shown in table does not include 50 establishments sampled independently from the aerospace industry.**

Area	Area Code	Total Private	Total State and Local Go
Atlanta-Sandy Springs-Gainesville, GA-AL CSA	122	558	65
Boston-Worcester-Manchester, MA-NH CSA	148	689	81
Buffalo-Niagara-Cattaraugus, NY CSA	160	251	30
Chicago-Naperville-Michigan City, IL-IN-WI CSA	176	1200	112
Cincinnati-Middletown-Wilmington, OH-KY-IN CSA	178	249	30
Cleveland-Akron-Elyria, OH CSA	184	321	42
Columbus-Marion-Chillicothe, OH CSA	198	250	36
Dallas-Fort Worth, TX CSA	206	662	75
Dayton-Springfield-Greenville, OH CSA	212	250	30
Denver-Aurora-Boulder, CO CSA	216	318	38
Detroit-Warren-Flint, MI CSA	220	523	71
Hartford-West Hartford-Willimantic, CT CSA	278	251	29
Houston-Baytown-Huntsville, TX CSA	288	556	80
Huntsville-Decatur, AL CSA	290	248	29
Indianapolis-Anderson-Columbus, IN CSA	294	248	30
Los Angeles-Long Beach-Riverside, CA CSA	348	1199	129
Louisville-Elizabethtown-Scottsburg, KY-IN CSA	350	249	29
Milwaukee-Racine-Waukesha, WI CSA	376	252	30
Minneapolis-St. Paul-St. Cloud, MN-WI CSA	378	440	55
New York-Newark-Bridgeport, NY-NJ-CT-PA CSA	408	1300	153
Philadelphia-Camden-Vineland, PA-NJ-DE-MD CSA	428	631	76
Pittsburgh-New Castle, PA CSA	430	266	29
Raleigh-Durham-Cary, NC CSA	450	251	31
Sacramento--Arden-Arcade--Truckee, CA-NV CSA	472	250	59
San Jose-San Francisco-Oakland, CA CSA	488	761	107
Seattle-Tacoma-Olympia, WA CSA	500	388	65
Washington-Baltimore-No. Virginia, DC-MD-VA-WV CSA	548	883	111
Albany-Schenectady-Troy, NY	10580	88	25
Albuquerque, NM	10740	95	18

Area	Area Code	Total Private	Total State and Local Gov't
Amarillo, TX	11100	100	19
Atlantic City, NJ	12100	99	16
Auburn-Opelika, AL	12220	103	35
Austin-Round Rock, TX	12420	249	34
Bangor, ME	12620	119	24
Baton Rouge, LA	12940	76	17
Billings, MT	13740	153	17
Birmingham-Hoover, AL	13820	109	15
Bloomington, IN	14020	72	23
Bloomington-Normal, IL	14060	106	15
Brainerd, MN	14660	46	28
Brownsville-Harlingen, TX	15180	113	27
Cedar Rapids, IA	16300	118	15
Centralia, WA	16500	64	38
Charleston-North Charleston, SC	16700	120	21
Charlotte-Gastonia-Concord, NC-SC	16740	188	23
Claremont, NH	17200	28	15
Clarksburg, WV	17220	44	18
Columbia, SC	17900	112	25
Corning, NY	18500	37	20
Corpus Christi, TX	18580	121	21
Elkhart-Goshen, IN	21140	101	6
El Paso, TX	21340	105	25
Emporia, KS	21380	37	25
Fayetteville, NC	22180	114	27
Fort Collins-Loveland, CO	22660	86	17
Fort Walton Beach-Crestview-Destin, FL	23020	106	8
Fresno, CA	23420	102	23
Grand Rapids-Wyoming, MI	24340	88	9
Great Falls, MT	24500	102	15

Area	Area Code	Total Private	Total State and Local Gov't
Greenville, SC	24860	112	16
Hickory-Lenoir-Morganton, NC	25860	99	17
Holland-Grand Haven, MI	26100	90	11
Honolulu, HI	26180	93	18
Iowa City, IA	26980	100	40
Jackson, MS	27140	113	29
Jacksonville, FL	27260	138	11
Johnstown, PA	27780	104	17
Kalispell, MT	28060	50	13
Kansas City, MO-KS	28140	219	30
Kennewick-Richland-Pasco, WA	28420	95	19
Knoxville, TN	28940	129	19
Lafayette, LA	29180	100	9
Lancaster, SC	29580	36	17
Las Vegas-Paradise, NV	29820	216	17
Lincoln, NE	30700	122	28
Little Rock-North Little Rock, AR	30780	108	20
Logansport, IN	30900	39	21
Madison, WI	31540	111	25
Manitowoc, WI	31820	55	17
Meadville, PA	32740	45	15
Medford, OR	32780	106	14
Memphis, TN-MS-AR	32820	250	31
Miami, OK	33060	52	36
Miami-Fort Lauderdale-Miami Beach, FL	33100	527	71
Mobile, AL	33660	89	14
Monroe, LA	33740	106	22
Mount Airy, NC	34340	38	16
Murray, KY	34660	33	36
Muskegon-Norton Shores, MI	34740	103	17

Area	Area Code	Total Private	Total State and Local Gov't
Nashville-Davidson--Murfreesboro, TN	34980	169	24
New Orleans-Metairie-Kenner, LA	35380	107	23
Nogales, AZ	35700	45	16
Ocala, FL	36100	108	18
Oklahoma City, OK	36420	116	20
Omaha-Council Bluffs, NE-IA	36540	100	12
Orlando, FL	36740	237	19
Ottumwa, IA	36900	44	20
Paducah, KY-IL	37140	41	12
Palatka, FL	37260	44	28
Palm Bay-Melbourne-Titusville, FL	37340	129	17
Phoenix-Mesa-Scottsdale, AZ	38060	427	42
Portland-Vancouver-Beaverton, OR-WA	38900	252	29
Providence-New Bedford-Fall River, RI-MA	39300	159	21
Quincy, IL-MO	39500	54	17
Reading, PA	39740	107	14
Reno-Sparks, NV	39900	114	12
Richmond, VA	40060	253	31
Roanoke, VA	40220	122	13
Rochester, NY	40380	111	20
Rockford, IL	40420	115	12
St. Louis, MO-IL	41180	301	35
Salem, OR	41420	108	32
Salinas, CA	41500	108	27
Salisbury, MD	41540	113	23
Salt Lake City, UT	41620	145	17
San Antonio, TX	41700	173	30
San Diego-Carlsbad-San Marcos, CA	41740	289	45
Sarasota-Bradenton-Venice, FL	42260	103	9
Sioux City, IA-NE-SD	43580	102	12



Area	Area Code	Total Private	Total State and Local Gov't
Springfield, MO	44180	124	13
Starkville, MS	44260	27	27
State College, PA	44300	82	39
Tallahassee, FL	45220	81	40
Tampa-St. Petersburg-Clearwater, FL	45300	279	25
Toledo, OH	45780	100	13
Tucson, AZ	46060	108	19
Tulsa, OK	46140	94	10
Tuscaloosa, AL	46220	91	23
Virginia Beach-Norfolk-Newport News, VA-NC	47260	154	27
Visalia-Porterville, CA	47300	88	30
Wausau, WI	48140	99	9
Wilmington, NC	48900	124	19
Wooster, OH	49300	49	18
York-Hanover, PA	49620	127	13
Youngstown-Warren-Boardman, OH-PA	49660	116	17
Southeastern Nebraska-Northwestern Missouri	90001	52	42
Northwest Texas	90002	33	34
Bedford, Fulton, Juniata Counties PA	90003	25	10
Caledonia and Orleans Counties, VT	90004	24	10
Carroll and Jo Daviess Counties, IL & Lafayette C	90005	50	21
Southwestern Mississippi	90006	60	36
Esmeralda, Lyon and Mineral Counties, NV	90007	52	26
Fannin, Gilmer, and Lumpkin Counties, GA	90008	53	23
Fayette, Lee Counties, TX	90009	43	19
Ferry, Okanogan Counties, WA	90010	18	27
North Central Kansas	90011	60	50
Lee, Norton City, Wise Counties, VA	90012	55	33
Sanilac County, MI	90013	48	23
Total - All Survey Areas		27089	4400

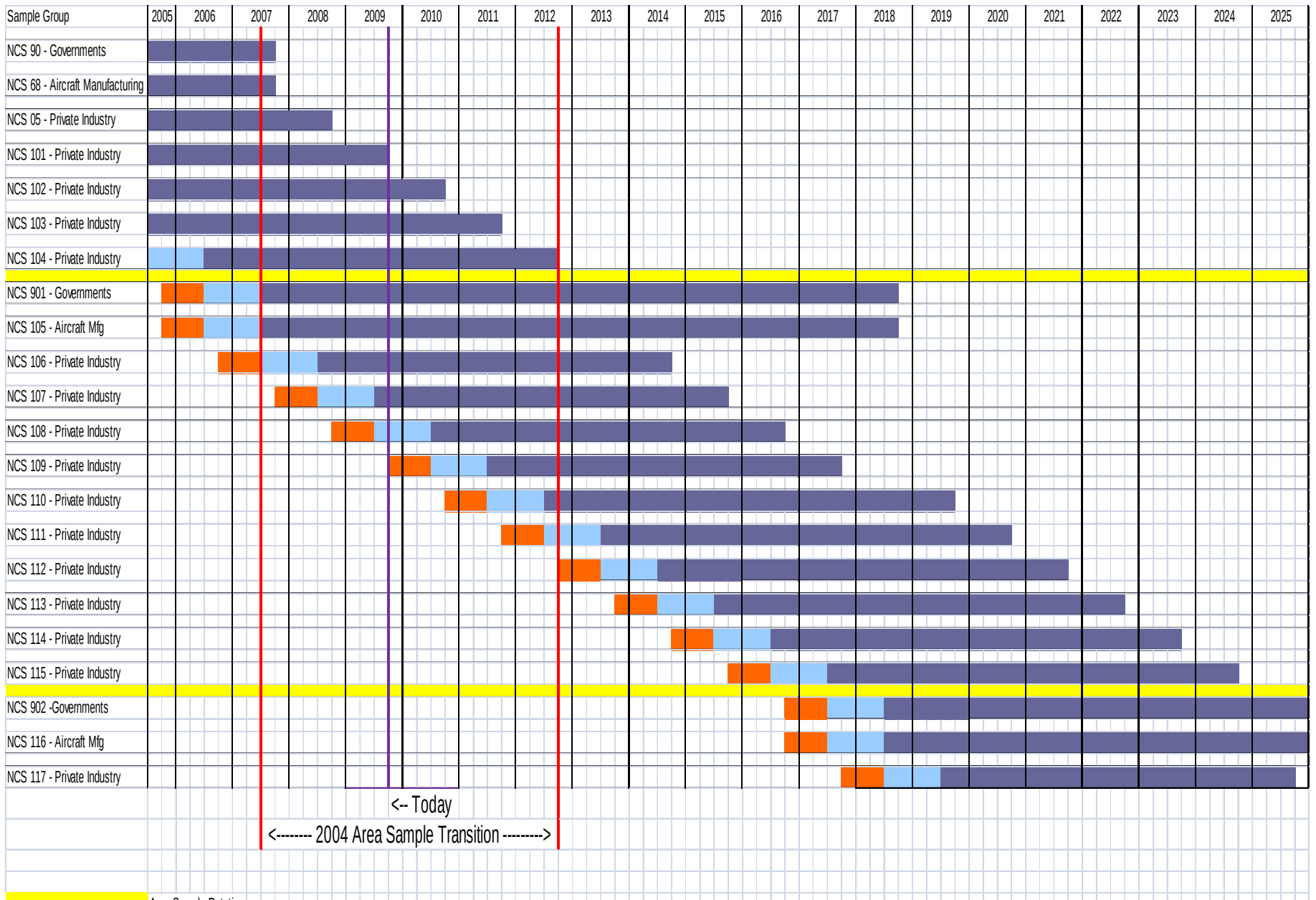
In-scope employment	NCS Area	In-scope establishments
2,048,222	Atlanta-Sandy Springs-Gainesville, GA-AL CSA	142,984
2,622,436	Boston-Worcester-Manchester, MA-NH CSA	161,991
463,840	Buffalo-Niagara-Cattaraugus, NY CSA	28,560
3,861,672	Chicago-Naperville-Michigan City, IL-IN-WI CSA	244,637
893,908	Cincinnati-Middletown-Wilmington, OH-KY-IN CSA	49,072
1,181,636	Cleveland-Akron-Elyria, OH CSA	74,253
824,733	Columbus-Marion-Chillicothe, OH CSA	44,933
2,565,754	Dallas-Fort Worth, TX CSA	142,314
380,299	Dayton-Springfield-Greenville, OH CSA	22,268
1,193,645	Denver-Aurora-Boulder, CO CSA	95,483
1,836,030	Detroit-Warren-Flint, MI CSA	111,840
545,693	Hartford-West Hartford-Willimantic, CT CSA	33,151
2,232,138	Houston-Baytown-Huntsville, TX CSA	119,698
205,012	Huntsville-Decatur, AL CSA	12,680
839,031	Indianapolis-Anderson-Columbus, IN CSA	48,436
5,901,695	Los Angeles-Long Beach-Riverside, CA CSA	390,188
550,909	Louisville-Elizabethtown-Scottsburg, KY-IN CSA	33,699
794,265	Milwaukee-Racine-Waukesha, WI CSA	42,222
1,647,299	Minneapolis-St. Paul-St. Cloud, MN-WI CSA	100,571
8,168,608	New York-Newark-Bridgeport, NY-NJ-CT-PA CSA	615,164
2,370,622	Philadelphia-Camden-Vineland, PA-NJ-DE-MD CSA	155,847
1,001,297	Pittsburgh-New Castle, PA CSA	62,094
648,791	Raleigh-Durham-Cary, NC CSA	41,047
668,957	Sacramento--Arden-Arcade--Truckee, CA-NV CSA	47,057
2,870,852	San Jose-San Francisco-Oakland, CA CSA	181,538
1,491,433	Seattle-Tacoma-Olympia, WA CSA	106,947
3,338,032	Washington-Baltimore-No. Virginia, DC-MD-VA-WV CSA	224,372
326,082	Albany-Schenectady-Troy, NY	21,267
362,495	Albuquerque, NM	20,276
287,025	Allentown-Bethlehem-Easton, PA-NJ	18,794
396,157	Amarillo, TX	5,591
409,285	Atlantic City, NJ	6,603
381,426	Auburn-Opelika, AL	2,457
605,334	Austin-Round Rock, TX	38,251

In-scope employment	NCS Area	In-scope establishments
428,106	Bangor, ME	3,913
294,632	Baton Rouge, LA	19,805
598,277	Billings, MT	6,007
409,746	Birmingham-Hoover, AL	26,823
282,495	Bloomington, IN	3,683
418,468	Bloomington-Normal, IL	3,413
374,851	Brainerd, MN	2,922
438,225	Brownsville-Harlingen, TX	5,871
490,680	Cedar Rapids, IA	7,081
524,374	Centralia, WA	1,735
454,636	Charleston-North Charleston, SC	16,281
720,529	Charlotte-Gastonia-Concord, NC-SC	45,064
231,076	Claremont, NH	1,062
384,420	Clarksburg, WV	2,109
411,878	Columbia, SC	16,227
339,107	Corning, NY	1,849
463,960	Corpus Christi, TX	9,001
306,494	Elkhart-Goshen, IN	4,841
409,348	El Paso, TX	12,780
318,240	Emporia, KS	899
421,222	Fayetteville, NC	5,982
336,155	Fort Collins-Loveland, CO	9,999
372,479	Fort Walton Beach-Crestview-Destin, FL	5,936
384,060	Fresno, CA	14,803
327,417	Grand Rapids-Wyoming, MI	16,177
412,880	Great Falls, MT	2,579
427,781	Greensboro-High Point, NC	17,312
425,201	Greenville, SC	15,069
358,326	Hickory-Lenoir-Morganton, NC	7,442
331,782	Holland-Grand Haven, MI	5,403
351,868	Honolulu, HI	23,912
409,015	Iowa City, IA	3,924
430,345	Jackson, MS	12,685
514,638	Jacksonville, FL	38,642
405,874	Johnstown, PA	3,468
416,309	Kalispell, MT	4,266
834,907	Kansas City, MO-KS	53,824
395,132	Kennewick-Richland-Pasco, WA	4,895
489,305	Knoxville, TN	15,576
387,956	Lafayette, LA	9,401
260,970	Lancaster, SC	1,053
779,190	Las Vegas-Paradise, NV	48,971
462,116	Lincoln, NE	8,163
404,121	Little Rock-North Little Rock, AR	20,592
343,828	Logansport, IN	690
408,325	Madison, WI	14,567
440,651	Manitowoc, WI	1,688

In-scope employment	NCS Area	In-scope establishments
385,980	Meadville, PA	2,099
396,539	Medford, OR	6,149
516,686	Memphis, TN-MS-AR	24,606
550,011	Miami, OK	575
1,955,368	Miami-Fort Lauderdale-Miami Beach, FL	195,749
348,922	Mobile, AL	9,369
391,202	Monroe, LA	4,752
321,058	Mount Airy, NC	1,628
331,444	Murray, KY	841
368,967	Muskegon-Norton Shores, MI	3,011
424,653	Muskogee, OK	1,406
628,861	Nashville-Davidson--Murfreesboro, TN	35,982
438,541	New Orleans-Metairie-Kenner, LA	34,698
380,529	Nogales, AZ	1,184
392,962	Ocala, FL	8,105
450,069	Oklahoma City, OK	32,496
393,617	Omaha-Council Bluffs, NE-IA	22,993
891,345	Orlando, FL	62,181
413,537	Ottumwa, IA	829
375,740	Paducah, KY-IL	2,702
340,081	Palatka, FL	1,426
469,358	Palm Bay-Melbourne-Titusville, FL	14,603
1,556,862	Phoenix-Mesa-Scottsdale, AZ	100,979
856,908	Portland-Vancouver-Beaverton, OR-WA	66,747
581,962	Providence-New Bedford-Fall River, RI-MA	44,387
442,489	Quincy, IL-MO	1,900
409,423	Reading, PA	8,683
394,916	Reno-Sparks, NV	14,244
491,711	Richmond, VA	33,755
452,140	Roanoke, VA	8,303
414,382	Rochester, NY	23,493
425,676	Rockford, IL	7,499
1,112,832	St. Louis, MO-IL	67,693
370,035	Salem, OR	9,507
400,786	Salinas, CA	7,979
432,819	Salisbury, MD	3,041
540,816	Salt Lake City, UT	40,323
678,406	San Antonio, TX	37,748
1,061,305	San Diego-Carlsbad-San Marcos, CA	71,286
363,986	Sarasota-Bradenton-Venice, FL	23,822
406,312	Sioux City, IA-NE-SD	3,938
412,066	Springfield, MA	14,697
465,067	Springfield, MO	10,668
294,624	Starkville, MS	787
290,142	State College, PA	3,201
299,235	Tallahassee, FL	9,195

In-scope employment	NCS Area	In-scope establishments
1,004,489	Tampa-St. Petersburg-Clearwater, FL	81,663
351,719	Toledo, OH	14,890
417,485	Tucson, AZ	19,654
366,340	Tulsa, OK	23,734
342,777	Tuscaloosa, AL	4,417
578,039	Virginia Beach-Norfolk-Newport News, VA-NC	38,436
323,420	Visalia-Porterville, CA	5,716
379,831	Wausau, WI	3,133
457,490	Wilmington, NC	9,893
390,468	Wooster, OH	2,425
472,175	York-Hanover, PA	8,599
421,110	Youngstown-Warren-Boardman, OH-PA	13,337
424,208	Atchison, Holt Counties MO & Johnson, Nemaha, Otoe, Pawnee, Richardson Counties NE (Southeastern Nebraska-Northwestern Missouri)	1,403
245,730	Baylor, Briscoe, Childress, Cottle, Dickens, Floyd, Foard, Hall, Hardeman, Haskell, Kent, King, Knox, Motley, Stonewall, Throckmorton Counties, TX (Northwest Texas)	1,145
203,336	Bedford, Fulton, Juniata Counties PA	1,797
203,492	Caledonia and Orleans Counties, VT	1,733
393,168	Carroll and Jo Daviess Counties, IL & Lafayette County, WI	1,450
458,821	Claiborne, Franklin, Jefferson and Wilkinson Counties, MS (Southwestern Mississippi)	393
437,908	Esmeralda, Lyon and Mineral Counties, NV	1,100
444,309	Fannin, Gilmer, and Lumpkin Counties, GA	1,628
316,406	Fayette, Lee Counties, TX	1,051
151,459	Ferry, Okanogan Counties, WA	1,248
382,662	Graham, Norton, Osborne, Phillips, Rooks, Smith Counties, KS (North Central Kansas)	874
435,842	Lee, Norton City, Wise Counties, VA	1,606
342,918	Sanilac County, MI	842
<b>108,011,978</b>	<b>Total – All Survey Areas</b>	<b>5,328,096</b>

**Appendix B: NCS Sample Rotation**  
See next page.



Attachment C



Using OES Data for  
Federal Pay...

Attachment D



valuating\_Sample  
Design\_Issue...