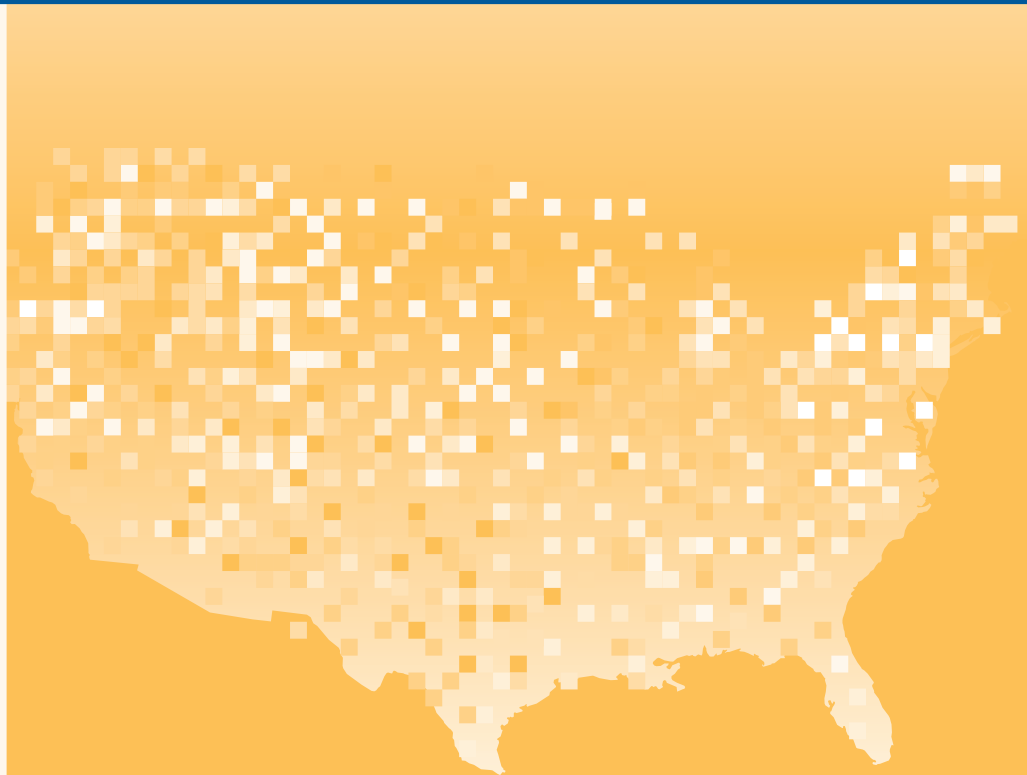# O∗NET

O∗NET Data Collection Program

Office of Management and Budget Clearance Package Supporting Statement

September 2, 2005

Submitted by:
U.S. Department of Labor
Employment and Training
Administration

Submitted to:
Office of Management and
Budget

O∗net®

**U.S. Department
of Labor**

**Employment
and Training
Administration**

O*NET® Data
Collection Program

**Office of Management and Budget
Clearance Package Supporting Statement
and Data Collection Instruments**

September 2, 2005

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Appendices

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A.   Justification

A.1   Circumstances of Information Collection

This is a request for a 3-year clearance from OMB to continue with the Occupational Information Network (O*NET®) Data Collection Program. The program currently focuses on 810 O*NET-SOC occupations which are based on the Standard Occupational Classification, mandated by OMB for use by all federal agencies collecting occupational and labor market information. Thus far, data have been published for 380 O*NET-SOC occupations. An additional 100 occupations are scheduled for publication in December 2005. At this time data are actively being collected on 330 occupations. This request is to continue the collection of data for those occupations until completed, and to collect new data on selected-high growth occupations along with new and emerging O*NET-SOC occupations over the next 3 years (FY2006–2008), subject to annual budget levels. The identification of new and emerging occupations, along with the skill requirements information generated by the O*NET data collection, will help inform future revisions and updates of the Standard Occupational Classification (SOC).

The O*NET Data Collection Program is an ongoing activity to populate and maintain a current database on the detailed characteristics of workers, occupations, and skills. The continued population of the O*NET database is important because the resulting updated O*NET database will continue to be the most comprehensive standard source of occupational information in the United States. The O*NET Data Collection Program is at the center of an extensive network of occupational/skill information used by a wide range of audiences, including individuals making career decisions, public agencies such as Workforce Investment Boards and One-Stop Career Centers making training investment decisions, educational institutions preparing a future workforce, and employers making staffing and training decisions. This program provides a common language and framework to meet the administrative needs of various federal programs, including workforce investment and education and training programs of the Departments of Labor and Education. The O*NET database and companion O*NET career exploration tools are being used by many private companies and public organizations to develop applications that use O*NET information, tailored to meet their customer needs. We describe the uses of the O*NET Program in further detail in ***Section A.2***. Also, information about the O*NET Data Collection Program can be found at the National O*NET Program's public Web site, http://www.onetcenter.org/ (the O*NET portal page that links to several O*NET-related Web sites), and http://www.doleta.gov/programs/onet (the U.S. Department of Labor, Employment and Training Administration [ETA] Web site).

The O*NET Data Collection Program employs a multiple method approach to updating the O*NET database. The primary method utilizes a two-stage sample design to survey

establishments and workers within those establishments. In addition to this primary method, alternative or supplementary methods include sampling from professional and trade association membership lists and sampling from lists of identified occupation experts. These approaches are utilized for selected occupations, such as when an association has excellent employment coverage, occupations with small employment size, ones in which employees work in remote locations, and ones for which no employment data exist from which to sample, as well as for new and emerging occupations. In all methods, the O*NET survey instruments are used. More detailed information on these multiple methods is presented in *Section B.1.*

In 1999, a pretest was conducted to assess the impact of incentives and other methodological components on response rates. A report documenting the pretest activity and results was included in the 2002 O*NET OMB submission and can be found at http://www.onetcenter.org/ombclearance.html.

The remainder of this section describes the O*NET Program and reviews statutory and regulatory information.

A.1.1 What Is the O*NET Program?

The O*NET Program is a comprehensive system for collecting and disseminating information on occupational and worker requirements. The O*NET data supersede the Department of Labor's *Dictionary of Occupational Titles* (DOT) and provide additional occupational requirements not available in the DOT. The DOT is no longer updated or maintained by DOL.

As depicted in *Exhibit A-1*, the O*NET Program uses a data structure, the Content Model, to organize occupational information and provides a common language of standardized and defined occupation descriptors and measures for use by all audiences. The O*NET Content Model is the result of extensive research, and its development is fully documented (Peterson, Mumford, Borman, Jeanneret, & Fleishman, 1995; Peterson, Mumford, Borman, et al., 1997; Peterson et al., 2001).

The Content Model comprises six domains:

- *Worker Characteristics*: includes Abilities, Interests, and Work Styles;

- *Worker Requirements*: includes Basic Skills, Cross-Functional Skills, General Knowledge, and Education;

- *Experience Requirements*: includes Training, Experience, and Licensing Requirements;

- *Occupation Requirements*: includes Generalized Work Activities, Work Context, and Organizational Context;

- *Occupation-Specific Requirements*: includes Occupational Knowledges, Occupational Skills, Tasks, Machines, Tools, and Equipment; and

- *Occupation Characteristics*: includes Labor Market Information, Occupational Outlook, and Wages, based on existing data sources.

Exhibit A-1. O*NET Content Model
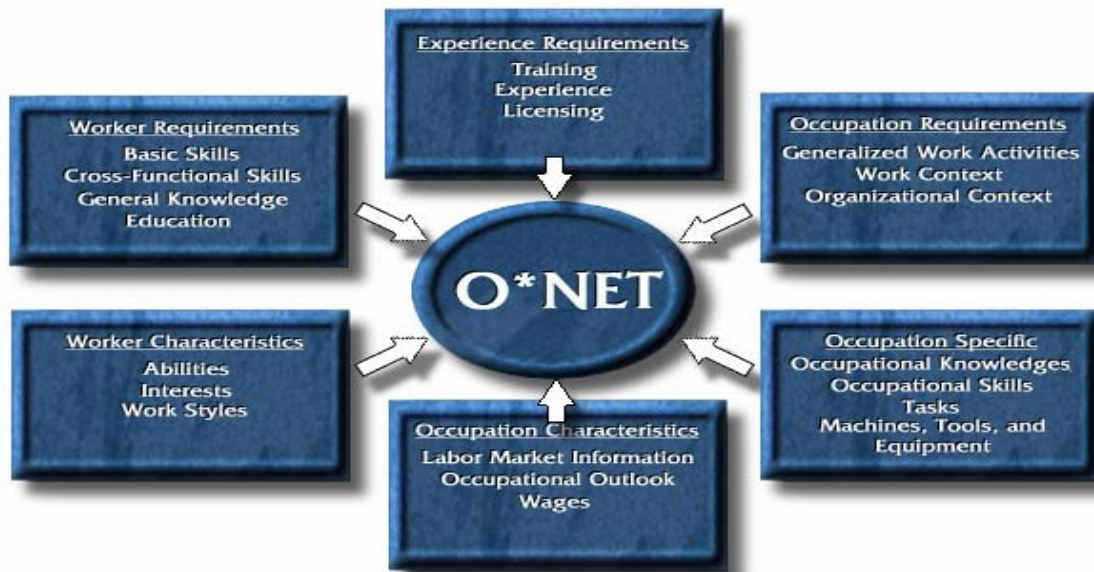
Each domain of the Content Model employs a hierarchical structure used to group information. For example, the Worker Characteristics domain contains three types of information: *Abilities, Interests*, and *Work Styles*. The Abilities domain, in turn, contains four types of abilities: *Cognitive, Psychomotor, Physical*, and *Sensory*. Each of these types of abilities contains further levels of detail. For example, Psychomotor abilities include *Fine Manipulative, Control Movement,* and *Reaction Time and Speed* abilities. Finally, the Fine Manipulative abilities contain three specific descriptors: *Arm-Hand Steadiness, Manual Dexterity,* and *Finger Dexterity*.

The O*NET Program takes the best knowledge about both content and methodology from the last 60 years of research since the first DOT. The descriptors and rating scales for O*NET data were developed through extensive research, drawing primarily from job analysis in industrial/organizational (I/O) psychology and human resource management (Peterson et al., 1995). The use of questionnaires and rating scales reflect the most currently accepted approach to job analysis. The scales used for the O*NET ratings are *Importance*, *Level*, and *Frequency*. Each item (descriptor) in the O*NET questionnaires may use one or more scales. For example,

the O*NET skill descriptor "Coordination" is rated on both a 5-point *Importance* scale and a 7-point *Level* scale. Refer to ***Appendix A*** for the complete set of O*NET questionnaires.

    Exhibit A-2 summarizes the number of descriptors and scales included in the O*NET Data Collection Program questionnaires. Data are being collected using 239 descriptors that include 400 scales contained in the Content Model domains. Currently, ratings for the Abilities domain are collected using trained occupational analysts who review updated information (e.g., tasks, generalized work activities) provided by job incumbents. In the future, the analyst rating procedure will also be used to collect new Skills domain information for high-growth occupations and for new and emerging occupations. (See ***Section A.1.2*** for a discussion of the preferred data source.) No data collection is planned for the Occupational Characteristics domain. Information for Occupational Characteristics will be provided through links to the employment, wage, and long-term projections databases produced by the Bureau of Labor Statistics (BLS), the state employment security agencies, and other agencies.

Exhibit A-2. Summary of O*NET Data Collection Program Questionnaires

O*NET Data Collection Program Questionnaires	Number of Descriptors			Data Source
	Number of Items	Number of Scales for Each Item	Total Number of Scales	
Skills	35	2	70	Incumbents[a] and Analysts[b]
Knowledge	33	2	66	Incumbents[a]
Work Styles[c]	16	1	16	Incumbents[a]
Education & Training[c]	5	1	5	Incumbents[a]
Generalized Work Activities	41	2	82	Incumbents[a]
Work Context	57	1	57	Incumbents[a]
Abilities	52	2	104	Analysts
Tasks[d]	varies	2	varies	Incumbents[a]
Total (not including tasks)	239		400	

[a] Occupation Experts (OEs) utilize the same questionnaires as incumbents for those occupations that use this method.
[b] Occupational analysts will be used to collect new Skills domain information for high-growth and new and emerging occupations
[c] The Knowledge Questionnaire packet also includes the Work Styles and Education & Training Questionnaires.
[d] All incumbents are asked to complete a Task questionnaire in addition to the domain questionnaire.

The first version of the O*NET database released to the public was O*NET 98. O*NET 98 moved from the DOT's more than 12,000 occupations to a more user-friendly 1,122 occupations, based on the BLS Occupational Employment Statistics (OES) codes. The O*NET 98 database contained 306 descriptors and 684 scales. A review of O*NET 98–specific scales and descriptors during the preparation for pretest data collection led to some consolidation and deletion of descriptors and scales to reduce burden and increase the employee response rate.[1] The O*NET 98 database was first replaced with the O*NET 3.1 database and has been updated several times as new data are collected and analyzed. The current database, O*NET version 8.0, contains the same descriptors used in O*NET 98; however, the occupations are restructured and coded to the 1998 Standard Occupational Classification (SOC). As a result of the restructuring and recoding, O*NET 8.0 currently has 810 occupations. Research is underway to identify additional new and emerging occupations in high-growth industries. New occupations emerge due to changes in technology, society, law, business practices, and markets. As these new and emerging occupations are identified and data are collected, they will be integrated into the O*NET-SOC occupation classification and database.

O*NET 8.0 has a Web-based accessing application called O*NET OnLine, which is available to the public at no cost at http://online.onetcenter.org/. An electronic version of the 8.0 database can be downloaded at http://www.onetcenter.org/ (the O*NET portal page). The O*NET 8.0 database has been restructured to incorporate improvements made to the O*NET data collection instruments and is the structure currently being offered to developers.

Data in the O*NET database include the mean ratings on each of the items (or descriptors) in the O*NET questionnaires. Ratings have been standardized to facilitate interpretation and comparison. Examples of specific data in the O*NET database include mean rating data on level and importance for various questionnaire items and text information on occupational definitions, descriptor definitions, scale anchors, and task descriptions.

The Foundation for the O*NET Program

The DOT, first published by DOL in 1939, provided the occupational classification and descriptions needed for operation of the public Employment Service. The collection of information for the DOT was done primarily through observation and interview techniques conducted by trained occupational analysts. These techniques were applied to a small number of job incumbents from what can best be characterized as a "convenience" sample. The DOT has not been maintained or updated since 1991; many of its observations were conducted during the 1970s.

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[1] See *Revision of O*NET Data Collection Instruments*, available at http://www.onetcenter.org/resData.html (Hubbard et al., 2000).

In the late 1980s, the Employment & Training Administration of the Department of Labor began a review of the DOT program. The purpose was to address concerns about the cost and difficulty of maintaining the DOT using the existing methods, and the need for additional and more current information. In 1990, as part of the DOT review, the Secretary of Labor appointed the Advisory Panel on the DOT. In response to its charge to advise on improvements to the DOT, the Panel called for development of a new database of occupational information, a concept that has evolved into the O*NET database. An important theme throughout the Panel's recommendations was the development of a common language about jobs, occupations, and skills. The Panel's complete report is presented in *Appendix B.*

A.1.2 The O*NET Data Collection Approach

The O*NET Data Collection Program is a critical step in the full updating of the O*NET database to reflect the most current occupational skills and attributes. In the research leading to the O*NET Data Collection Program, various sources and methods for collecting occupational information were examined, including collection of data from job incumbents and supervisors, and development of ratings by subject matter experts and occupational analysts. Based on this work, the O*NET team has determined that the preferred source of data for most domains (Generalized Work Activities; Work Context; Knowledge, Education and Training; and Work Styles) is job incumbents, while occupational analysts who are provided with updated information from job incumbents are preferred for the Abilities domain, which tends to be more abstract. The Skills domain, whose variables tend to have a modest level of abstraction, is a strong candidate for either source of collection. In addition, other occupation experts, such as supervisors and trainers, may be used where access to job incumbents proves difficult or where the sampling of business establishments is inefficient.

Previous studies that compare various sources of job analysis ratings suggest that incumbents are able to provide information across a variety of descriptor domains (Peterson, Owens-Kurtz, Hoffman, Arabian, & Whetzel, 1990; Fleishman & Mumford, 1988). In addition, "large samples of knowledgeable job incumbents are available, which should contribute to the reliability of the resulting descriptive system" (Peterson, Mumford, Levin, Green, & Waksberg, 1999). Furthermore, the world of work is constantly changing and technological advancements are occurring so rapidly that an efficient and effective way to remain current and accurate is to obtain the information directly from those performing the work.

Workers selected to participate in the O*NET Data Collection Program as part of a random sample are provided with questionnaires and asked to rate the requirements of their own jobs as defined by the questionnaire items. The responses are tabulated into statistics, such as mean ratings for each scale.

The Advisory Panel on the DOT also recommended using sampling techniques that would ensure the representativeness and accuracy of the occupational data. By contrast, no systematic sampling methods were used in the development of the original DOT.

Collecting representative information from job incumbents presents many challenges; among them is determining the best method for identifying a representative sample of job incumbents in each occupation. In particular, the O*NET Program is concerned with identifying sampling approaches that minimize burden on employers and the public, achieve broad coverage of the workers in each occupation, ensure acceptable response rates, and are cost-effective.

Three types of sampling frames are available for identifying samples of workers in each occupation: lists of individual workers identified through professional and trade associations, licensing agencies, and unions; households; and employer establishments. Each option was evaluated in light of the criteria mentioned above, and each offered advantages and disadvantages.

Identifying sampling frames of workers through professional and trade associations and unions is a good approach for some occupations. One advantage of this method is lower response burden, as contacts with a sample of employers are replaced with contact with one or a few associations. This procedure also removes the cost of soliciting and maintaining employer cooperation but adds the cost of soliciting and maintaining association cooperation.

However, a major limitation of the Association method of data collection is coverage. This method can be used only where association membership encompasses a significant share of employment in the occupation, which may be difficult to identify accurately. The membership of many associations consists of people in multiple occupations, retired individuals, and other interested parties. Further, few associations keep occupation information on their membership. Where coverage of employment in specific occupations by association membership is significant but not broad enough, the Association method and the Establishment method for incumbent data collection may be used in a dual-frame sample design, as described in ***Section B.1.3***.

The Establishment survey approach provides the advantage of lower response burden and cost when compared with a household survey, as well as good coverage for the large majority of occupations. Response burden and costs are lower for two primary reasons. First, there are more workers per employer than per household. Thus, fewer contacts are required to identify workers. Second, employer contacts can be minimized by focusing on the employers most likely to employ workers in each occupation for which the sample is needed. Efficient sample design is possible because the distribution of employment in an occupation is usually a function of the industry of the employer. Employment by occupation by industry is measured by the federal-

state Occupational Employment Statistics program national estimates provided by the Bureau of Labor Statistics.

The Establishment survey provides good coverage of wage and salary employment as long as an acceptable employer sampling frame is available. Coverage of self-employment is more difficult, although the sampling frame used in O*NET surveys includes many establishments operated by self-employed workers. Coverage of unpaid family workers in an employer sampling frame is minimal or zero, but the number of workers involved is quite small (135,000 nationwide in 1999 [BLS, January 2000]).

The Establishment survey approach was selected as the primary method to update the O*NET database and was pretested in 1999 and 2000. The O*NET Program is currently collecting the majority of data using this approach. Achieving high response rates with the Establishment method can be problematic, as this approach requires cooperation at two levels— first by the employer and then by the sampled worker. However, based on experience to date, high levels of cooperation have been attainable, and this method has proven very successful. Even though the response rates are acceptable, we will continue to take steps to enhance the response rates. Current and future efforts to improve response rates are discussed in *Section B.3*.

The Establishment method provides the best approach for most occupations, and the Association method is used for a small number of occupations, either in a dual frame or alone, depending on the coverage provided by the association. The dual-frame approach may be used to supplement the Establishment method, when the latter is not sufficient to obtain the necessary number of observations. With both approaches, continuous improvement in survey design and methods has been implemented and is anticipated to continue to increase response rates.

Occupation expert (OE) data collection is a third method of collecting information on occupational characteristics and worker attributes. In this method, persons who are considered experts in the target occupation, rather than job incumbents, are surveyed. This method is used for occupations as necessary to improve sampling efficiency and avoid excessive use of burden, such as when employment data is low and workers are widely scattered, or when employment data is not available, as is the case for some new and emerging occupations. The limitation of the OE method is that it can be hard to find OEs. For some occupations, it is difficult to identify a professional association, and in other cases the association may not have sufficient information about its membership to identify experts for a specific occupation.

Using most appropriate sources of information (e.g., workers, occupation experts, and analysts) and the multiple method approach described above, the O*NET Data Collection Program is able to collect and yield high-quality occupational data efficiently.

A.1.3　　Summary of the O*NET Data Collection Program

The O*NET Data Collection Program is an ongoing effort to populate and maintain the O*NET database with valid, reliable, and current occupational data. The primary data collection method used to update the O*NET database is Establishment data collection, a survey of establishments and workers within those establishments. Establishment data collection uses a sample design known as the *General Employer Sample*. This is a two-stage design that uses: (1) a statistical sample of establishments expected to employ workers in each specific occupation and (2) a sample of workers in the occupations within each sampled establishment. The sampled workers are asked to complete the survey questionnaires.

Four domain questionnaires are used to collect data from sampled workers: Skills, Knowledge (including Work Styles and Education and Training), Generalized Work Activities, and Work Context.[2] Each sampled worker is randomly assigned one of the four questionnaires. The workers are also asked to provide basic demographic information and to complete a brief task inventory for their specific occupation. Workers may complete the paper questionnaire and return it via mail, or they may choose to complete the questionnaire online at the project Web site. Questionnaires are available in Spanish for selected O*NET-SOC occupations. Data for a fifth domain, Abilities, are provided by trained analysts because of the more abstract nature of the questions. *Exhibit A-2* in *Section A.1.1* lists the questionnaires, the number of items and scales, and data sources.

As described in *Section A.1.2*, in addition to Establishment data collection, two alternative data collection approaches, the Association method and the Occupation Expert (OE) method, are utilized for selected occupations, such as those with small employment size, ones in which employees work in remote locations, ones for which no employment data exist from which to sample, and new and emerging occupations. In the Association method, incumbents are sampled from member rosters of professional associations that include a significant portion of the occupation's workers in their membership. In the OE method, occupation experts are identified and asked to complete the four domain questionnaires, the demographic items, and the task inventory for the specific occupation being surveyed. More details on these data collection approaches are included in *Section B.2*.

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[2] Occupational analysts will be used to collect new Skills domain information for high-growth and new and emerging occupations. Thus, the number of domain questionnaires will be reduced to three for all data collection methods used for these occupations. For simplicity, we refer to four domain questionnaires throughout the rest of the Supporting Statement.

A.1.4　Steps in the Data Collection Process

The O*NET Data Collection Program involves the following broad steps.

Sample Design. The sampling approaches employed in the O*NET program are designed to create and update the O*NET database in a highly cost-efficient and timely manner while maximizing the amount of reliable information in the database. The primary method for collecting this information is the Establishment method, a survey of workers employed in a national probability sample of establishments. This method essentially uses a stratified two-stage design in which businesses (the primary stage) are selected with probability proportional to the expected number of employed workers in the specific occupations being surveyed, and a sample of workers (the secondary stage) is selected in the occupations within the sampled businesses. The selected workers are then asked to complete one of the four O*NET domain questionnaires.

For selected occupations, respondents are recruited from professional and trade association member lists; this is the Association method. To be selected for O*NET data collection, an association must (1) represent the O*NET-SOC occupation in the nature of the work performed by its members, (2) contain a high percentage of the total occupational employment, and (3) be willing to provide a list of its members in a form usable as an O*NET sampling frame. Professional associations, licensing authorities, and commercial companies are contacted for possible inclusion in the Association method. The sample selection procedures vary across associations, depending on the type of information available on association members. In general, association lists are sampled using a single-stage, stratified, simple random sampling approach. Stratification by geographic location and occupation subspecialty is considered if it is appropriate to the occupation. In most cases, the Association method is used in conjunction with the Establishment method in a dual-frame approach.

The OE method is used for occupations that are also well represented by a professional or trade association, and a sample of occupation experts can be readily identified. For this method, stratified samples of experts are selected from lists of potential OEs. These potential experts are questioned to determine whether they meet the specified criteria to serve as an OE for their respective occupations. Those meeting the criteria are then asked to complete all four O*NET domain questionnaires for their occupations. The OE method is used with occupations for which the Establishment and Association methods are problematic. Examples include occupations with very low rates of employment, new and emerging occupations that do not yet have industry employment data, and those whose incumbents are in remote locations that are difficult to access. Additional information regarding sampling can be found in *Section B.1*.

Data Collection. Data collection operations are conducted at the O*NET Operations Center in Raleigh, NC. The Operations Center's Business Liaisons contact sampled business establishments, secure the participation of a point of contact (POC), and work with the POC to carry out data collection in target occupations. Then materials are mailed to the POCs, and completed questionnaires are returned, received, and processed.

In the Establishment and Association methods, each sampled worker is randomly assigned only one of the four domain questionnaires. For the OE method, identified experts are asked to complete the four questionnaires. All respondents are also asked to provide basic demographic information and to complete a brief task inventory for their specific occupation. Workers (in the Establishment and Association methods) can complete the paper questionnaire and return it via mail, or they can complete the questionnaire online at the project Web site. In the future, for the OE method, online questionnaires will be available to experts. ***Section B.2*** details data collection procedures.

Data Cleaning and Identification and Evaluation of Anomalous Cases. Data cleaning procedures eliminate completely blank questionnaires and insert consistent analysis codes for legitimate skips, blank items and invalid responses. Anomalous cases are identified to remove respondents whose responses suggest that they are not working in the occupation of interest or are highly inconsistent with those of the others in the occupation. Unusable cases are identified using prescribed eligibility criteria, such as percentage of items completed. Cases with certain questionable characteristics are flagged for further analysis. These cases include those with deviant response patterns relative to other cases in the occupation and with write-in job titles that do not appear to match the occupation. Responses judged by expert reviewers to be invalid are excluded from the analysis file. On average, these activities eliminate about 9% of returned questionnaires. Both processes are described in ***Section A.16.1.***

Weighting and Estimation. Estimates generated from O*NET survey data are computed using sampling weights that compensate for the unequal probabilities of selecting establishments, occupations within establishments, and employees within each selected occupation. In addition, these base weights are adjusted to further compensate for multiple sub-waves of sampling, sample adjustment, under- and overcoverage of the population caused by frame imperfections, and nonresponse, at both the establishment and the employee levels.

These weight adjustments can lead to weights that are very large or very small relative to the weights for other sample units. Such weight variability often increases the standard error estimates. When the variation in the weights is large, it is desirable to trim the weights to reduce the variation. For the O*NET estimates, the weighting process involves a weight trimming process in which extremely large or small weights are truncated to fall within a specified range.

Although trimming weights can introduce bias in the estimates, the variance reduction it achieves usually offsets the potential bias, resulting in estimates with smaller net mean squared errors.

Final estimates are produced based on a pooled sample of all completed waves and the O*NET pretest. Estimates are computed by summing the weighted observations and dividing by the sum of the weights. Standard errors are estimated using the first-order Taylor series approximation of deviations of estimates from their expected values. These design-based variance estimates are computed using SUDAAN® software (Research Triangle Institute, 2001). These estimates properly account for the combined effects of clustering, stratification, and unequal weighting—all of which are present in the O*NET data. In addition, estimates satisfying certain criteria are flagged "recommended for suppression" within the O*NET database. Estimates are flagged if at least one of the following three conditions is met: (1) the sample size is less than 10, (2) the variance is 0 and the sample size is less than 15, or (3) the relative standard error is greater than 0.5. Approximately 4% of the estimates are suppressed, on average. Further information on the calculation of weights and variance estimates can be found in **Section B.1.2.2**.

Analysis. Nonresponse is analyzed at multiple levels. Establishment nonresponse in the O*NET Data Collection Program can occur at the verification, screening, recruiting, or sampling stages of selection. Employee-level nonresponse occurs when a selected employee fails to complete and return a questionnaire. Since these same characteristics of establishments and employees were used to adjust the analysis weights, compensation has been made to further reduce the size and impact of any nonresponse bias. In addition, we assess item-level nonresponse and have found that item response rates are very high, generally over 90% for Likert scale items, with most exceeding 95%.

For each O*NET-SOC occupation, the degree of inter-rater reliability (the covariation among ratings) and the level of inter-rater agreement (the absolute difference among ratings) is calculated annually. The results of the analyses are used to examine the potential sources of variability across respondents within a specific occupation. These results also inform an evaluation of the O*NET-SOC occupational taxonomy, Content Model descriptors, and scales as part of a continuous improvement process. Analysis processes are described in **Sections A.16.1** and **A.16.2**.

A.1.5   Summary of Response Rate Experience to Date

Data collection using the Establishment method began in June 2001, and 27 waves were completed as of September 30, 2004. Within the 27 waves, 69,149 establishments were selected for the sample. The sample of establishments was selected with probability proportional to size

where the size measure for an establishment is roughly proportional to its expected number of employees in the targeted occupations. This selection method gave establishments with a greater expected number of employees in these occupations a greater chance of being selected for these waves.

During the first phase of the data collection process, the 69,149 establishments were contacted by an O*NET Business Liaison, who explained the O*NET data collection effort and attempted to elicit participation from a suitable POC at the establishment. Fifteen percent of the establishments were ineligible for the study because they were out of business, a frame duplicate, or otherwise out of scope for the survey for some other reason (e.g., industry change). Among the eligible establishments, 70% agreed to participate in the data collection effort.

After an establishment agreed to participate in the study, it was sent relevant information about the occupations of interest for that establishment. Subsequent calls were made to the establishment to gather data on its total number of employees in up to five occupations of interest which were randomly chosen from the occupations being targeted at the establishment. The employment information obtained from the POC on the five occupations was used to select up to 20 employees within each establishment. The limits of five occupations and 20 employees were set to keep the burden on any one particular establishment manageable, thus helping to maintain a high level of employer participation. Within the 27 waves, a total of 118,254 employees were selected and sent a questionnaire (usually through the POC, to preserve confidentiality), and an incentive. A total of 77,138 employees completed their questionnaire, for an employee response rate of 65%.

It is difficult to make response rate comparisons between the O*NET Data Collection Program and other establishment surveys due to some unique design characteristics. First, participation in the O*NET survey is completely voluntary rather than mandatory. Experiments conducted by the Bureau of the Census suggest that simply informing respondents that their response is mandatory adds about 20 percentage points to overall response (Worden & Hoy, 1992; Tulp, Hoy, Kusch, & Cole, 1991). Thus, since this is a voluntary survey, we would expect response rates to be about 20 percentage points lower than the average federally mandated survey.

Another unique and important feature of the O*NET design is the fact that the survey organization conducting the data collection does not have direct, personal contact with the ultimate respondent for the survey, the sampled employees. Rather, the requirement of respondent anonymity means that participation at the employee level relies exclusively on the interactions between the POC and the employee. In their review of establishment mail survey response rates, Paxson, Dillman, and Tarnai (1995) found that establishment surveys that

featured anonymous mailings reported response rates that were more than 30 percentage points lower than surveys having direct, personal contact with the respondents.

Another unique characteristic of the O*NET survey is that it requires participation at two stages of response—the POC level and the employee level—whereas the typical establishment survey requires participation at only one level, the establishment level. Because very few surveys incorporate such a design, survey methods literature is essentially devoid of examples upon which to base a reasonable response rate expectation for the O*NET Data Collection Program. Therefore, the comparison of O*NET response rates with other establishment surveys is done separately for each stage of participation. First, we compare the O*NET establishment-level response rate with other mail establishment surveys having only one response stage at the establishment level. Then we compare the O*NET employee-level response rate with the response rate of other establishments' self-conducted employee surveys.

Paxson et al. (1995) analyzed the response rates for 46 surveys conducted by both government and nongovernment organizations. Among the surveys in their study, 26 were conducted by the Social and Economic Sciences Research Center (SESRC) at Washington State University and 20 were conducted by the U.S. Bureau of the Census. The SESRC, directed by Dr. Donald Dillman, is well known for its development of the Total Design Method approach to mail surveys (Dillman, 1978; 2000) and its high response rates in implementing that methodology. Further, the 20 Census Bureau surveys include 12 well-established and ongoing, mandatory surveys. The average response rate for all 46 surveys is 63%, but if only voluntary surveys are considered, the average response rate drops to 55%. These results suggest that the O*NET establishment-level response rate of 70% exceeds expectations for this type of survey.

The second response stage of the O*NET survey can be compared to establishment surveys in which the ultimate sampling units are the employees of the establishment. Since federally sponsored surveys of employees within organizations are quite rare, the literature on their response rates is sparse. Most surveys of this type are employee satisfaction surveys. For example, one well-documented government-sponsored survey of employees is the Public Service Employee Survey, administered to more than 190,000 employees of the federal Public Service of Canada and conducted by Statistics Canada in 1999. A questionnaire was delivered to each employee by a government agent who personally requested that the employee complete the questionnaire and return it by mail. Multiple follow-ups of nonrespondents were made by e-mail and interoffice mail to maximize the response rate. No incentive was used, however; because all sample members were also employees of the organization conducting the survey and could fill out the survey on government time, the use of an incentive was thought to be unnecessary. The final overall response rate for the survey was 55%.

The U.S. Office of Personnel Management (OPM) developed the Organizational Assessment Survey (OAS) and has encouraged all federal agencies to survey their employees in order to evaluate organizational performance, benchmark best practices, and align performance with important and measurable outcomes. The experience OPM has had in implementing these surveys within numerous federal agencies provides some evidence of response rates for employee surveys conducted by the U.S. federal government. The OAS design is very similar to the Canadian Public Service Employee Survey design. The surveys are self-administered and are conducted by each agency for its own employees. Furthermore, like the Public Service Employee Survey, the OAS request to participate is personalized and made directly to the employee by the agency administrator. The features of the design offer a significant advantage over the O*NET survey design, as previously noted.

Although the results of the OAS surveys are not publicly available, an official at OPM was able to provide some general information regarding OAS response rates (C. Simons, personal communication, March 21, 2002). According to OPM, response rates for OAS surveys vary considerably by agency, from 30% to 80%. However, the average response across all agencies is approximately 57%. This result is similar to the Canadian experience. It is further supported by Roth and BeVier (1998), who conducted a meta-analysis of 173 surveys in the field of Human Resource Management and Organization Behavior (HRM/OB). They found that surveys implementing many of the response-rate-enhancing features of the O*NET survey had response rates in the range of 23% to 78%, with a median of 51%. These results suggest the O*NET employee response rate of 65% also exceeds expectations for mail surveys of employees within their organizations.

In summary, results from the survey methods literature and from other federal surveys in the U.S. and in Canada suggest that the current 70% establishment response rate and the 65% employee response rate exceed expectations for federal surveys that use a similar data collection approach. However, methods for further improving response rates will continue to be explored, and response rates are fully expected to continue to increase as the O*NET Data Collection Program progresses. *Section B.3* summarizes the enhancements that have been implemented since the last OMB approval was received in September 2002 to maximize response rates and further reduce the impact of potential nonresponse bias in estimates produced from the O*NET data collection effort.

A.1.6   Statutory and Regulatory Information

While the O*NET name is not referenced specifically in statute or regulation, O*NET information is the foundation, the common language, for carrying out the responsibilities related to the statutory and regulatory sections listed below.

Section 309 of the Workforce Investment Act (Employment and Training Administration [ETA], DOL, 2000) requires the Secretary of Labor to oversee the "development, maintenance, and continuous improvement of a nationwide employment statistics system," which shall include, among other components, "skill trends by occupation and industry." The O*NET Program is the primary response vehicle for collecting skills information across all occupations. Updating the entire O*NET database is a critical component of the nationwide labor market information system to support employer, workforce, and education information needs. The states are to develop similar statewide employment statistics systems.

The Workforce Investment Act (WIA) contains numerous references identifying the skill requirements of jobs; for example, Section 154 requires local determinations of the "skills and education that are necessary to obtain the employment opportunities" in the local area, and Section 134 requires that "information on job skills necessary" be provided to obtain jobs listed for the local area.

The WIA also contains references to identifying and assessing the skills of individuals; for example, Section 134 allows the provision of assessment services to identify "the skill levels and service needs of adults and dislocated workers." Section 129 allows funds to be used to provide youth with an assessment "which shall include a review of basic skills, occupational skills, prior work experience, employability, interests, aptitudes (including interests and aptitudes for nontraditional jobs), supportive service needs, and development needs of such participant…." In Section 136, the "attainment of basic skills and, as appropriate, work readiness or occupational skills" may be included as performance indicators for youth programs. The O*NET Career Exploration Tools, including the O*NET Interest Profiler and O*NET Work Importance Locator, are such assessment tools designed specifically to relate a person's interests and work values to the information on education and skill requirements for occupations that is provided in the O*NET database.

Section 508 of the Rehabilitation Act of 1973 as amended specifies that persons with disabilities should have access to and use of the same information that persons without disabilities have. To comply with this section, the O*NET Data Collection Program designed its online application, O*NET OnLine, in a manner that ensures that the data and information are accessible to the widest possible audience, including persons with disabilities. O*NET OnLine also provides links to several accommodation and disability resources on the Internet. Furthermore, the O*NET Program Web site, the Department of Labor's ETA O*NET Web site, and O*NET OnLine have all been "Bobby Approved," indicating that the Center for Applied Special Technology has deemed them accessible to persons with disabilities.

The Secretary of Labor's Workforce Information System Plan for FY2001–2005 includes as one of its priorities the collection of occupational skills data, stating, "During FY2001, ETA initiated the data collection program for the Occupational Information Network—O*NET—to update the database and refresh it on a regular basis. ETA also will continue research and development on O*NET measurement concepts and data collection methods" (U.S. Department of Labor [USDOL], October 2001). In addition, the Plan establishes the improvement of occupational information products as one of its major goals, noting, "The quality and availability of information about occupations will be maintained and improved by enhanced occupational and career information products, short-term employment forecasts, and skills-oriented information using O*NET and other skills research and databases." Providing the most current information on the O*NET skills—the purpose of the proposed data collection effort—is key to supporting the needs of customers through the wide variety of public and private-sector products that depend in part on the availability of O*NET information.

Currently, ETA continues to focus on skills through its support of a new business model for workforce information. This new business model for workforce information supports a demand-driven workforce system, a major emphasis of "A Competitive Workforce," which is Goal 4 in the Department of Labor's new strategic plan. A major focus of this goal is the dissemination of economic and workforce information, of which O*NET supplies the common language on skills, knowledges, abilities, and other work requirements and characteristics.

Finally, the predecessor to the O*NET database, the DOT, is cited either directly or indirectly in a number of places as a source of occupational information in support of federal programs. The DOT is cited in the Code of Federal Regulations (CFR) in 30 places. These citations are generally related to determining disability, administering DOL employment and training programs, or administering immigration, civil rights, and labor standards law. DOL officials responsible for the O*NET Program are working with DOT users in the federal government, such as State Department officials responsible for visas, the Bureau of Apprenticeship Training, Foreign Labor Certification, and others. This work is focused on helping these entities to make the transition from use of the DOT to use of O*NET information.

Copies of the sections of the WIA, the Perkins Act, and the specific CFR citations are presented in *Appendix C*.

A.1.7   Federal Register Notice

The Federal Register notice asking for public comment prior to submission of this request to OMB is presented in *Appendix D.* Comments received and responses are described in *Section A.8*.

A.2   Uses/Products and Services Based on the O*NET Program

The O*NET Program supersedes the DOT and is a powerful tool for various critical federal and state workforce investment functions. The O*NET Program integrates a powerful relational database and a common language for occupational and skill descriptions into a value-added tool for businesses, job seekers, and the workforce development professionals who help bring them together. By providing information organized according to the O*NET Content Model, the O*NET database is an important tool for keeping up with today's rapidly changing world of work.

A.2.1   The O*NET Database

There will have been four major updates of the O*NET database by September 2005.

Update	Number of Occupations Updated
November 2003	54
July 2004	126
December 2004	100
June 2005	100

The O*NET database currently provides:

- detailed occupational and skill information for more than 800 occupations.
- information on standardized descriptors of skills, abilities, interests, knowledge, work values, education, training, work context, and work styles.
- occupational coding based on the 2000 SOC.

Future updates of the O*NET database will include identification of and information about new and emerging occupations.

Furthermore, O*NET OnLine, a Web-based application at http://online.onetcenter.org, provides Internet access to the O*NET database and offers:

- updated occupational information.
- enhanced quick search and crosswalk search. Improved tiered search algorithms enable users to search by word or code/partial code without worrying about code format.
- an Occupation Quick Search that provides users with immediate and continuous ability to start a new occupational search.

- the ability to browse by O*NET Descriptor. This search enables users to make cross-occupational comparisons by viewing a rank order of occupations based on a selected knowledge, skill, or ability variable.
- inclusion of a sample of reported job titles, which provides the user with a better understanding/description of the O*NET-SOC occupation by viewing the job titles of people actually working within the occupation.
- report display options. By opening within the summary report, users get immediate information about an occupation and can choose to view a more detailed report or to build a custom report.
- inclusion of additional information. Links to related association Web sites are included to provide the user with information on related jobs, specialties, and/or industries.

A.2.2   Use of O*NET Products

Use of O*NET products has increased dramatically over the past few years. O*NET OnLine (http://online.onetcenter.org/) currently averages 180,000 visits per month, up from 55,000 visits per month 3 years ago. The O*NET portal site (http://www.onetcenter.org) averages 43,000 visits per month. In addition, there are four other major indicators of the extent of use of O*NET information in both the public and private sectors. One is the number of individuals and firms who have submitted user certification information indicating their intent to use the O*NET database. A second indicator is the number of Web sites linked to various O*NET sites available on the Internet. A third indicator is the number of users of systems that incorporate O*NET data. The last indicator is the number of O*NET product downloads. Each of these is discussed briefly below.

A.2.3   User Certifications Submitted

As of November 2004, more than 1,232 firms and individuals have submitted certification information indicating their intent to use O*NET data in other products. This certification form is voluntary, so the actual number is likely higher. User profile data, gathered over the last 12 months, provides the breakdown of O*NET user groups shown in *Exhibit A-3*. The percentage share of registered users is listed by the indicated category type.

While specific information is not available on how each user is using the O*NET data, many are using it to build applications. For example, career information systems incorporate O*NET data and reach millions of customers during the year. A goal of the O*NET Program has been to encourage private and public developers to build applications and deliver the information to the public, and the O*NET Program is clearly meeting that goal.

Exhibit A-3. Main Categories of O*NET Database Users

Type of O*NET User Submitting Certification	Proportion
Educational Services	17%
Computer System Design and Programming Services	11%
Government and Public Administration	10%
Vocational Rehabilitation Services	7%
Health Care	6%
Employment Services	5%
Human Resources and Executive Search Consulting	3%
Professional, Scientific, and Technical Services	3%
Employment Placement Agencies	2%
Individual and Family Services	2%
Real Estate	2%
Internet Publishing	1%
Research and Development – Social Services and the Humanities	1%
Other	30%

A.2.4   Internet Web Site Linkages

Based on an informal exploratory search conducted in November 2004:

- More than 1,400 sites link to O*NET OnLine (http://online.onetcenter.org).
- Hundreds of sites link to the O*NET portal page (http://www.onetcenter.org/).
- Nearly 700 sites link to the O*NET government site (http://www.doleta.gov/programs/onet).

The most common types are links to various O*NET Web sites from:

- libraries and career centers based in higher education;
- higher education institutions' schools of business, labor and industrial relations, psychology, education, and counseling;
- government agencies (primarily state labor-related agencies, some federal and local);
- public libraries (especially those offering career and job search assistance programs);
- career counselors, coaches, and recruiters (mostly private sector vendors);
- career exploration or job search assistance (both private and public sector);
- public school systems, educational associations, and secondary schools (often recommending the O*NET database as a resource for faculty, parents, and high school juniors and seniors);
- human resources management;

- lawyers specializing in immigration law;
- vocational rehabilitation/occupational medicine and health; and
- international sites in Turkey, Canada, the United Kingdom, Holland, Japan, Bangladesh, and others.

A.2.5   O*NET Product Downloads

From January 2002 to October 2004, there were 159,866 downloads of O*NET products:

Database	15,309
Ability Profiler	43,717
Interest Profiler	44,544
Work Importance Locator	25,648
CIP-WIP Software	30,648
Total downloads	159,866

The Ability Profiler, Interest Profiler, and Work Importance Locator make up the O*NET Career Exploration Tools and are designed for career counseling, career planning, and career exploration. These assessment tools assist a wide variety of individuals in gaining personal insights into occupations that they might find satisfying. The use of O*NET products in public and private ventures is steadily increasing and is an indication of the widespread use of O*NET data and products.

A.2.6   Examples of the O*NET Program in Published Literature

- The recently published *Career Pathways Handbook* provides a comprehensive tool for guidance counselors and individuals incorporating information from the O*NET database. Written by Jim Cassio (see http://www.cassio.com), it includes the latest U.S. employment statistics, as well as O*NET information including occupation titles and definitions, common job tasks, key skills and abilities, and related occupations. Cassio's organization, the Workforce Information Group (http://www.work-info.com) provides workforce and labor market information research, publishing, and systems development using O*NET as a resource.

- The O*NET Program is featured in a chapter of *Unfocused Kids—Helping Students to Focus on their Education and Career Plans*. Author Harvey Schmelter-Davis has demonstrated the value of O*NET information in dozens of workshops for counselors, career development specialists, teachers, and students. At Rutgers University, he developed a training package to introduce O*NET to educators. In his chapter, Mr. Schmelter-Davis explains the O*NET system from a counselor's perspective and suggests how to use it in career counseling and teaching. He describes how others are using O*NET resources to help youth focus on their strengths and interests and relate them to career opportunities in the workplace.

- "**The Big 'O' in Your Job Search: O*NET,**" by Jane M. Lommel, Ph.D., is the title of a "NetWorking" article that appeared on Gary Johnson's Brave New Work World Web site (http://www.newwork.com). This article provides an extensive overview of the entire O*NET system, including descriptions of the skills and competency information available at http://online.onetcenter.org. The article highlights ways different workforce professionals, counselors, and employers use O*NET to accomplish their goals. Additional Web sites, such as http://www.careerclusters.org/16clusters.htm, developed by National Association of State Directors of Career Technical Education Consortium, are linked to this article. At the career clusters Web site, O*NET concepts are related to 16 major clusters in which the Consortium believe almost all occupations can be categorized. Other O*NET related sites linked to the "Big 'O'" article offer online training and information: http://www.onetacademy.com, as well as access to the **O*NET Career Exploration Tools**: http://onetknowledgesite.com/jobseekers.cfm.

- **"Six Jobseekers in Search of Employers,"** by Matthew Mariani, was published in *The Occupational Outlook Quarterly*, summer 2003, a publication of the Bureau of Labor Statistics. This extensive article offers brief case studies of six different job seekers and how they used Internet resources, along with other traditional approaches, in their job hunting efforts. Taking readers through a step-by-step approach, Mr. Mariani describes how multiple Internet resources such as http://www.acinet.org and http://www.servicelocator.org/ can aid a job search effort. The article highlights the importance of using Internet tools correctly and in the context of a well-organized plan with multiple search methods. O*NET's potential usefulness is described in several individual searches. One case illustrates how the O*NET Code Connector (http://www.onetcodeconnector.org/) enables a job seeker to identify job vacancies that interest her, and another demonstrates how a job seeker uses O*NET OnLine to develop his resume and prepare for his interviews.

Research Articles

For a thorough list of research articles, books and book chapters, technical reports, and presentations referencing O*NET, see *Exhibit A-10* at the end of *Section A*.

A.2.7   Examples of O*NET Data and Products in Use

This section provides an overview and many examples of how O*NET information is used. The O*NET Program is an electronic system of databases and other products designed to be used by both public and private developers building products and resources to serve customers. By providing the essential data needed by these developers for the production of value-added products for workforce and economic development, the O*NET Program is providing a service to the public that is far greater than if the U. S. Department of Labor tried to develop these products themselves, effectively leveraging the investment of the tax dollars. At the same time, it would not be economically feasible for each of these developers to collect the data themselves, and would be burdensome to the public. Therefore, it is important to understand

the significance of the O*NET data as the underpinning for hundreds of products in the marketplace serving millions of customers (J. Wall, personal communication, June 20, 2002).

*Representative State Approaches to Using O*NET Products*

Connecticut

The Connecticut Department of Labor (CTDOL) used O*NET data to respond to the Workforce Investment Act (WIA) requirements that states assess (1) current and future job opportunities in the state, (2) the skills necessary to obtain those jobs, and (3) the skills necessary to meet the economic development needs of the state. To meet these requirements, they collected and analyzed labor market information and published an extensive report. Occupational skills information featured in the report was extracted from the O*NET database. The section describing skills necessary for Connecticut's high-demand occupations depended on O*NET data, especially Skills and Skill Descriptions. Another section of the report also presented O*NET skills needed by industry sectors that are a focus of state economic development efforts.

This use of O*NET was specifically designed for Connecticut's One-Stop employment and training system. Stakeholders in this system include community leaders, policymakers, planners, educators, counselors, service providers, and program operators at state and local levels. By using O*NET data, the state was able to save time and resources while meeting the planning needs of the state workforce development system.

Wisconsin

Wisconsin's Department of Workforce Development (DWD) works with a network of 79 local Job Centers (the equivalent of One-Stops) across the state. Each has a resource area and a mission to provide high-quality career information to job seekers and other customers. In many of the centers, local staff wanted or needed to become more knowledgeable about the career development needs of diverse clients and the array of resources available to assist them. To help staff improve their career development skills and services, DWD's Division of Workforce Solutions developed a 3-day, competency-based training curriculum that includes an introduction to O*NET information. Students use O*NET OnLine, the O*NET Work Importance Locator, and the O*NET Interest Profiler.

Utah

Utah Choices, the State's career information delivery system (CIDS), helps students and workers take charge of their careers, allowing its users to identify occupations that appeal to their particular interests and needs. The system also provides information about the education, experience, and skills these occupations require. The O*NET database is a key source of occupational information in the Utah CIDS for the following items:

- Description/typical tasks
- Basic skills
- General workplace skills (cross-functional skills)
- Physical abilities
- Personality types
- Work values
- Work conditions

Nebraska

The Nebraska Career Information System (NCIS), the state's comprehensive career information delivery system (CIDS), now uses O*NET data. The mission of the Nebraska CIDS is to facilitate the career development of children, adolescents, and adults. It accomplishes this goal by providing information and tools needed for developing career awareness, doing career exploration, and making career decisions and plans. In addition, the Nebraska CIDS staff develop curricula; provide training for educators, counselors, and agency staff; and collaborate with policymakers at the local, state, and national levels. The O*NET database is a primary source for developing occupation descriptions for the NCIS computer-based systems and printed resources.

Oklahoma

In Oklahoma City, One-Stop partner agencies in the Workforce Oklahoma Career Connection Center are using the O*NET Program in a broad effort to identify and meet specific employer needs in a timely, effective, and cost-efficient way. The Center uses an employer survey that provides a framework for customizing a service mix to meet specific employer needs. O*NET information is built into this survey to help employers clearly define their employment needs by job title and skill bundles.

Louisiana

Many states are also now working to integrate O*NET data into their operating systems. In particular, the Louisiana Department of Labor has integrated O*NET data into its business and operating systems. The O*NET Program supports services to employers and job seekers in the Louisiana Department of Labor's Career Search System.

Alabama

Alabama has a special Dislocated Worker module, which offers a skill survey questionnaire based on O*NET data. Users can identify their skills and link them to Alabama data on wages and employment outlook, as well as O*NET-SOC occupational descriptions and tasks.

Texas

Texas used O*NET data to identify the knowledge, skills, and abilities needed to obtain employment in 54 new and emerging or evolving occupations in eight industries. By using existing O*NET data, Texas improved the efficiency of gathering and presenting occupational data. This resulted in a savings of time and money when identifying and targeting resources to address skill gaps. Employment and training communities are now able to tailor instruction and training to match occupations in demand.

Local Role: One-Stop Career Center Services

There are 1,945 comprehensive One-Stop Career Center offices nationwide and another 15,725 partner or affiliated offices across the country for which current occupational information is essential. An example of the use of O*NET data in One-Stop Career Centers is the Northwest Wisconsin Concentrated Employment Program, Inc. or CEP. The Northwestern Wisconsin One-Stop is a private nonprofit agency that provides One-Stop Career Center services focused on the needs of business. It also serves job seekers and youth in 10 counties. The agency uses O*NET resources in multiple ways to help these diverse clients. To help businesses, O*NET information is often used as a starting point for customizing employer profiles and preparing job descriptions. O*NET resources may also be used when employers seek help with other human resources needs, such as succession plans and outplacement activities during downsizing or reorganizations.

Job seekers, WIA youth participants, and workers in transition use the CEP system to identify their abilities, styles, and strengths, and they receive a Career Compatibility Report, with a list of O*NET-SOC occupations that match their results. Participants then use O*NET OnLine to explore these occupations and find the ones that suit their interests and skills. They can use O*NET information in building long-range career plans, as well as in preparing résumés and describing their relevant job skills.

CEP case managers also use the reports and O*NET OnLine to help clients who need further career counseling. Students use the CEP system with O*NET OnLine for career exploration and educational planning. Seventeen school districts in northwest Wisconsin have started using these tools in their career guidance programs. Because both tools are on the Internet, students can use them at home as well as at school.

The Workforce Investment Board (WIB)

One of the most important entities involved in the WIA is the Workforce Investment Board. WIBs exist on both the state and local levels, and all of them are required to have majority business members. The purpose of the WIBs is to ensure that the public employment

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and training system remains business-focused and business-led. What follows is an example of business and government working together for the benefit of the community.

The Lancaster County Workforce Investment Board in Pennsylvania uses O*NET information in research and service delivery activities designed to support economic development efforts in the county. Using an industry clusters model, the Lancaster WIB cooperates closely with the economic development community. After defining the industry clusters, the primary occupations are profiled and a skills map is developed. O*NET is part of the skills map used in developing the profiles, providing extensive information about skills and knowledge requirements of occupations in each cluster. Information for all occupations and the various career ladders in the cluster can then be analyzed to identify common skills and attributes, as well as those unique to a particular occupation or career ladder. The resulting skills map is a helpful way to involve the education community in addressing skills gaps, taking a more systemic approach to the identification of the skill needs of industry.

A.2.8 The O*NET Program's Importance to Business and WIA Business Services in the One-Stop Career Centers

The O*NET Program has become an important tool for business and industry to use in many of their human capital investment decisions. In preparing workers to meet the skill requirements of business and industry, the publicly funded WIA contributes to the nation's prosperity. At the same time, O*NET serves the One-Stop community by enabling them to provide local business with useful Human Resources services. Some businesses have begun to think of their local One-Stop as a full-service human resource organization, supplying new employees as well as helping to retrain workers who become displaced due to plant closings and other layoffs. The following examples highlight business-led uses of the O*NET system, as well as examples in which the workforce investment community uses O*NET data to provide important services to business clients.

Manpower

Manpower, Inc., a worldwide provider of high-value staffing services with nearly 1,100 offices in North America and 4,000 offices in 63 countries, provides jobs to over 2 million people every year and serves more than 400,000 customers worldwide. The O*NET-SOC occupational and skills taxonomy helps Manpower match the right person for the right job. The O*NET system also offers a systematic structure that enhances Manpower's analysis of the employment marketplace as well as its tracking of staffing trends. By incorporating O*NET structure into its procedures, Manpower experienced benefits in a number of areas. These include being able to:

- accurately identify the types of placements each field office makes.
- locate field offices where the highest need and/or demand exists.
- more accurately consolidate information for various types of analysis, including marketing analysis.
- begin the process of having Manpower offices in other countries map their occupations to the O*NET system. This will enable Manpower to more efficiently consolidate information for global reporting.

Profiles International, Inc.

Profiles International, Inc. (PI) is one of several assessment companies that incorporates O*NET data in customized workforce development tools for public and private-sector use. PI's products are designed to help businesses improve their hiring practices, reduce turnover rates and costs, and enhance workforce harmony and performance. O*NET information is used extensively with the company's clients, including a number of public workforce agencies. In PI's system, job seekers begin with an assessment of their "soft skills," such as job behavioral traits, thinking style, and occupational interests. Their results are matched to O*NET-SOC occupations and presented in a Career Compatibility Report. It lists occupations that might be a good fit, explains how to use O*NET OnLine to get more information about them, and describes the results of the assessment.

The Career Compatibility Report also suggests how to gather additional career information and get assistance from counselors or workers already in the field. PI sets up private Web sites for its clients that managers can use to post their job openings and screen for suitable applicants. The site also describes O*NET OnLine and how to use O*NET information in drafting position descriptions and other human resource activities. This is especially helpful to small and mid-size companies without large human resource departments or formal position descriptions.

The HR-XML Consortium

The HR-XML Consortium has utilized the O*NET database in developing specifications that allow organizations to capture occupational information and use it efficiently in their established human resource processes, such as building competency models, conducting job analyses, or developing performance appraisal systems. As described on their Web site (www.hr-xml.org),

> The HR-XML Consortium is an independent, non-profit organization dedicated to the development and promotion of a standard suite of XML specifications to enable e-business and the automation of human resources-related data exchanges. By developing and publishing open data exchange standards based on

Extensible Markup Language ("XML"), the Consortium provides the means for any company to transact with other companies without having to establish, engineer, and implement many separate interchange mechanisms.

The members of the HR-XML Consortium include Cisco Systems, IBM, Microsoft, Oracle, the Gallup Organization, and Manpower, as well as many other technologically innovative companies. The O*NET Program is the featured content provider in an HR-XML schema explaining to HR-XML member organizations and to the public how to capture and exchange skills, abilities, and related human resources information.

California's Labor Market Information Division (LMID)

California's Labor Market Information Division (LMID) used O*NET to help displaced Pillowtex workers. The LMID is part of California's Employment Development Department (EDD). LMID gathers, analyzes, and produces occupational information to inform people about California's economy and aid in labor-related decisions. In response to layoffs at Pillowtex (a large household textile manufacturer, maker of Fieldcrest and Cannon, that declared bankruptcy and closed plants employing 6,000 workers across eight states), California's LMID created a "how to" instruction kit for assisting workers in mass layoffs called "Help for Dislocated Workers: Where to Get It . . . How to Present It." The LMID actually incorporated parts of O*NET OnLine in the Pillowtex toolkit, including the O*NET "Find Occupations and Skills Search capabilities." This toolkit shows how to use O*NET data and other resources to give dislocated workers an awareness of their current skills and abilities and also offers suggestions for alternative occupations that match those skills.

Oklahoma One-Stop Center

In another business-related example, a One-Stop Career Center in Oklahoma used O*NET data to help small establishments develop job descriptions. For one such employer, Center staff developed a series of job descriptions for skilled welders. These job descriptions were used as a basis for an in-house certified training program for welders.

A.2.9   O*NET Information for People in Transition

Because the O*NET database is becoming the core of any number of technology tools serving the workforce development system and employers today, it is impossible to accurately measure the number of users of the O*NET database. However, it is clear that systems with "O*NET in-it" currently serve millions of users. The Association of Computer-based Systems for Career Information (ACSCI) conducts regular surveys of its members to ascertain the type and extent of career information and services they deliver. In December 2003, the Association included a series of questions about the degree to which O*NET information and assessment

tools were included in Career Information Delivery Systems (CIDS). Responses received from 34 states that have statewide systems, along with two major career information firms, reported that their products were used in 29,000 sites across the country. These systems use O*NET data to present skills and characteristics information and to connect to labor market information.

The O*NET database is a key resource in addressing needs for many different audiences. Several private assessment and test developers have linked their instruments to the O*NET program. The system's common language serves as the means of linking various workforce development services into an integrated system for business customers, job seekers, educators, and students alike.

As shown by the services and products described below, the O*NET database is used by the military, dislocated workers, youth, educators and trainers, labor market specialists, career counselors, software developers, business forecasters, human resource professionals in business, and a host of other users.

HireVetsfirst.gov

HireVetsfirst.gov uses O*NET OnLine as a military skills translator to help veterans returning from active military duty reenter the workforce. Using their military occupational classification in O*NET OnLine's crosswalk function, they can identify equivalent civilian occupations. They can see typical tasks, skills, knowledge, and abilities; learn wage levels and employment outlooks both nationally and in their own localities; and search for actual job openings in areas of their choosing.

Boeing Corporation

When Boeing prepared to close its aircraft manufacturing plant in Monrovia, California, managers and workers teamed with the California Employment Development Department to identify workers' skills and align them with available jobs. They used the O*NET OnLine skills survey tool to identify the workers' skills and O*NET-customized reports to prepare a skills match report for workers. As a result, nearly 400 Boeing workers found positions at other Boeing facilities prior to layoff. With O*NET information about their skills and how those skills transfer to other occupations, workers were able to expand the scope of their job search.

Offutt Air Force Base

Offutt Air Force Base in Omaha, Nebraska, provides a comprehensive 5-day Transition Assistance Program (TAP) for personnel leaving military service. As part of this program, the Nebraska Workforce Development's Labor Market Information Center presents information on career exploration, finding employment, and training opportunities in the civilian job market. O*NET OnLine is prominently demonstrated as a key tool to help TAP participants relate their

skills and military experience to appropriate occupations and to learn about a wider range of career possibilities as they transition to civilian life and employment. Military personnel can thus tap into the entire range of O*NET-SOC occupational information to explore career possibilities in the civilian sector.

Nebraska Rapid Response

In addition, Nebraska uses O*NET data in the Rapid Response program at plants that are closing or facing large reductions in force. Workers first use information from the O*NET database to identify skills they have developed on the job. This information is used to find related occupations that might offer future employment.

Youth

Armed Services Vocational Aptitude Battery

The Defense Department's ASVAB (Armed Services Vocational Aptitude Battery) Career Exploration Program offers tools to help high school and postsecondary students learn about career exploration and planning. Developers of the ASVAB Program wanted to change its philosophy to emphasize wider career exploration and decision-making among its participants. Completely redesigned, the program now uses O*NET data to broaden occupational choices for nearly 1 million ASVAB participants at more than 14,000 of America's high schools annually. Students are encouraged to explore a variety of career possibilities suited to their interests and learn to make decisions based on information about themselves and about careers, instead of being directed to a few occupations that match their current abilities.

LifeWorks™

LifeWorks™ is an interactive career development Web site operated by the National Institutes of Health (NIH) Office of Science Education. Driven by O*NET data, the LifeWorks search engine, Career Finder, offers an array of information on more than 100 health and medical science careers. The Web site is designed for middle and high school students, parents, mentors, teachers, and guidance/career counselors. As a first step, students scan a list of O*NET job families and select the ones that most interest them. Next they identify the kinds of jobs that suit their interests, using the O*NET interest categories. Third, they select skills they have or want to acquire. The Career Finder then generates a customized list of health-related careers, with brief descriptions, that match the student's selections. By clicking on a title, students can view job-specific information on the summary page. If they like, they can get in-depth details about the occupation, including employment outlook, salary, suggested high school courses, related careers, and more.

New York CareerZone®

Designed by the State Department of Labor, the New York CareerZone Web site is an O*NET delivery system that has revolutionized the way New Yorkers access career information. The NYCareerZone system is now a statewide resource for teachers, counselors, and career center staff. The system engages students and job seekers in career exploration and helps them develop their skills in career planning and build electronic portfolios linked to state learning objectives and O*NET-SOC occupational information in the Web-based NYCareerZone system. NYCareerZone developers incorporated the O*NET Interest Profiler and skills search capabilities into the portfolios to help students identify their interests and relate them to appropriate career possibilities. Students can explore specific occupations using job profiles drawn from the O*NET database. The profiles include state-specific wage and outlook information related to the O*NET-SOC occupations and a link to a state college database. Up-to-date job openings are provided through a link to America's Job Bank so that students get a sense of real-world business expectations.

Educators and Trainers

The education and training system in the U.S. plays a significant role in preparing for the future skill needs of the American workforce. Identifying common or transferable skills needed across current and future occupations and designing curricula responsive to these needs is becoming increasingly important as the country adapts to changes brought on by a global, information-driven economy. O*NET information is used to help identify new and emerging and declining skills of occupations in the economy and to design program curricula to meet these needs. The use of O*NET OnLine is also recommended in reviewing existing secondary and postsecondary programs. O*NET OnLine provides comprehensive information to help schools identify and examine new or different occupations related to the ones they already target.

The O*NET Program assists training program operators, vocational and technical education program administrators, and planners in identifying skills and knowledge their customers need to meet changes in the world of work. With this knowledge, they can then respond to customer needs and offer training programs that will be relevant to both program participants and employers. Billions of federal, state, and local government and private employer dollars are used to support occupational skill-specific training for millions of people, and the O*NET Program supports more effective use of these funds. Perhaps most importantly, the O*NET data collection process provides a methodology for aligning data with changing conditions, providing a dynamic tool for continued alignment between employers and the educational community. Through a continuing focus on employer needs, ongoing data collection offers the prospect of continually refreshed insights into future hiring needs.

Lehigh Carbon Community College

Lehigh Carbon Community College, in Pennsylvania, has a federal demonstration grant to coordinate and develop curriculum in three areas in nanotechnology at the postsecondary level and two areas at the secondary level. Working primarily with Lehigh Career & Technical Institute, project staff find O*NET OnLine to be a handy, practical tool for faculty at both institutions. It offers an ideal starting point for occupational research essential to creating programs that respond to contemporary business and industry needs. O*NET OnLine provides detailed descriptions of occupations.

Researchers use the O*NET tasks, activities, and other elements for that occupation as a basis for further research and discussions with industry experts and representatives. O*NET information also was a good starting point for developing task statements that teachers could turn into performance objectives for courses. In addition, project staff could identify and obtain detailed descriptions of other, related occupations that might become part of the new training.

Temple University

Temple University's Center for Professional Development in Career and Technical Education, in Pennsylvania, supports professional growth and learning among all levels of educators who work with "career-bound" students. The Center offers certification and degree programs for secondary career and technical education teachers, curriculum supervisors, cooperative education coordinators, and career and technical school directors in the 17 counties of eastern Pennsylvania. Center faculty and staff incorporate O*NET OnLine in their courses on program planning and evaluation, curriculum development, and cooperative education. They also use it as an aid in structuring occupational competency assessment committee reviews. With its wealth of data on occupations, O*NET OnLine provides a reliable and readily accessible resource for planning and/or evaluating programs and developing curricula in career and technical education.

The U.S. Department of Education Office of Vocational and Adult Education (OVAE)

The Department of Education Office of Vocational and Adult Education developed a set of Career Clusters through the work of committees of local educators, employers, and other experts. These clusters demonstrate to students, parents, educators, and counselors the career paths related to student learning and enable them to plan for further educational attainment. The U.S. Department of Education, with the assistance of the State Directors of Vocational and Technical Education, has cross-walked career clusters to O*NET-SOC occupations at http://www.careerclusters.org/crosswalks.htm.

Disabled Workers

To maintain their competitive edge, businesses need to recruit and retain qualified employees. People with disabilities represent an important, largely underutilized source of labor. An independent assessment of an individual employee's interests, talents, and skills in relation to the requirements of available jobs can identify an excellent match, whether the candidate is disabled or not. Employees with disabilities often show lower turnover rates than their non-disabled counterparts. As employees with disabilities gain new experiences, skills, and knowledge on the job, they may be able to find an even better fit between their skills and interests and available jobs. Supervisors should not assume an employee's disability will be a barrier. In addition to the occupational data that the O*NET system provides, it also offers direct links to information about accommodations that can help employers in the hiring process.

American Foundation for the Blind

The American Foundation for the Blind (AFB) uses O*NET data to help the visually impaired expand their employment horizons. CareerConnect™ is a free employment planning resource for people who are blind or visually impaired. Sponsored by AFB, it helps people learn about the range and diversity of occupations available in the labor market. It also provides mentors and information about assistive technology that can help them do the work. This practical, easy-to-use resource incorporates O*NET data to supply essential information for career exploration and to open up a larger universe of jobs for people with visual impairments.

Maryland Division of Rehabilitation Services

Rehabilitation technical specialists at the Maryland Division of Rehabilitation Services, Workforce and Technology Center use O*NET data, Career Exploration Tools, and O*NET OnLine to provide career assessment services to help their clients transition into the workforce.

Community- and Faith-Based Programs

Catholic Charities

Catholic Community Services in Baton Rouge (CCSBR) offers a free Senior Employment Program (SEP) for workers ages 55 and older in the city and 17 other mostly rural civil parishes. With more than 25 years of experience, the agency is now a mandated partner in Louisiana's WIA initiatives. The program uses the O*NET Career Exploration Tools to help retirees and other older adults find jobs. SEP staff designed a concise and efficient job search assistance package that opens up their clients' horizons to a wider range of job possibilities. The O*NET Interest Profiler is a key tool in the process that helps clients learn what jobs are available and what they have to offer. SEP staff also use the O*NET Work Importance Locator, as it can be especially useful to clients who are contemplating a serious career change or have other complex employment problems, such as long-term unemployment.

Edgewood Terrace

At Edgewood Terrace in northeast Washington, DC, the Community Preservation and Development Corporation (CPDC) is helping unemployed and underemployed adults build career plans, develop job skills, and find employment. In one component of the CPDC career and skills enhancement program, staff use O*NET OnLine, among other resources, to help participants identify potential career goals. Participants leave the class with a long-term career plan fashioned as a résumé-builder. Some go on to specialized training programs in information technology. Others seek employment or further education in other fields. But all have an action plan, with next steps toward a better future. The career enhancement program is a vital part of a much broader and long-term effort "to revitalize an inner city neighborhood plagued with economic and physical deterioration and crime."

The Boys & Girls Clubs of America

The Boys & Girls Clubs of America developed a career preparation program to help teens make sound educational decisions, explore a variety of careers, and develop skills for success in the workplace. A system called CareerLaunch™ supports this program. This expanded career preparation Web site incorporates O*NET data, enabling teens to find O*NET career profiles related to their interests.

A.2.10   O*NET Data for Career Counseling

Career planning is a multiphase process that individuals undertake throughout their lives, from the elementary school years until a person retires from the workforce. During this process, individuals internally synthesize information about themselves and information about the world of work. O*NET information can assist individuals in this process. The O*NET database includes the following integral types of occupational and worker information for career decision-making:

- Occupational definitions
- Tasks
- Abilities
- Work activities
- Knowledge
- Education and training
- Skills
- Work styles
- Work context

The O*NET database serves not only as a direct resource of important career information, but also as a source for the value-added products of commercial and noncommercial

career information delivery systems and assessment developers. Career information delivery systems provide occupational and educational information for individuals in the process of career exploration and decision-making. Numerous commercial aptitude and interest inventories and instruments used in career decision-making also rely on O*NET information. O*NET data serve as a resource base for tools that utilize occupational information. These systems are used by millions of individuals each year.

Career Services at the University of Denver

The Career Services Office at the University of Denver provides career exploration support to students and alumni using O*NET tools. Students use the tools for initial career and job searches, and alumni return to explore alternatives when considering career changes. The O*NET system supplies an enhancement tool for the Strong interest inventory. Clients use O*NET data to explore the occupations resulting from the Strong assessment. Using O*NET data, they can see the tasks and the working environment for an occupation. With the related occupations function, they can see alternatives. Using the O*NET skill search process, clients can look for the common threads in occupations. When using the link to ACINet, clients can access the wage data for the nation and each state available for the occupations.

Minnesota and Texas

Minnesota created an innovative system using O*NET data that documents students' skills and work styles and tests these skills-based portfolios with local establishments. The Skill Attainment in Leadership program, or SAIL, is available at http://www.d.umn.edu/student/sail/sailCover.html. Texas uses the O*NET database as the foundation for its career exploration CD-ROM software, Occupation and Skill Computer-Assisted Researcher (OSCAR), http://www.ioscar.org/tx, developing links between O*NET data and skills taught in the classroom and integrating industry skill standards and industry-based job analysis into OSCAR to meet the needs of the business community.

Commercial Counseling and Assessment Tools

An industry of public, nonprofit, and commercial counseling and assessment tools has been built around the O*NET system, just as earlier tools were built around the Dictionary of Occupational Titles during its 60-year tenure. As was true in the past, no matter how elaborate these public and private systems become, their success remains dependent on the quality and comprehensiveness of their occupational data.

Keys2Work

Keys2Work, a private, nonprofit organization, offers a "community-based assessment and career development system" that helps students and job seekers, employers, and providers of

education and training. Using work-related skills assessments and online tools powered with O*NET data, the system demonstrates the relevance of school subjects to future careers and earnings. Using O*NET data, Keys2Work helps students see that what they earn in the future is directly related to the skills they acquire in school. Using ACT's WorkKeys®, students assess important work-related skills and match them to occupations. Keys2Work links these occupations to O*NET data, expanding students' horizons, allowing them to explore a wider range of occupations and obtain extensive information about them. Students can learn about common tasks and work activities; other knowledge, skill, and educational requirements; and interest profiles of workers. O*NET data provide the connection to related information, wages, and employment outlook.

Numerous commercial aptitude and interest inventories and instruments used in career decision-making also rely on O*NET information. Below are some examples of commercial products or Web sites that use O*NET data. The list is purely for illustrative purposes to indicate the size and number of users and does not imply any endorsement by the DOL. Many other products, services, or Web sites, could be substituted instead:

- **Assessment.com**—has developed Motivational Appraisal of Personnel Potential (MAPP)—online assessments linked to O*NET-SOC occupations.

- **VRI.org**—has Career Scope—online assessments linked to O*NET, with O*NET prominent in its logo.

- **Careerway.com**—has online assessments linked to O*NET, with O*NET prominent in its logo.

- **Careeredgesystem.com**—has an online interest assessment linked to O*NET-SOC occupations, with O*NET prominent in its logo.

- **ISEEK.org**, the **Internet System for Education and Employment**—Minnesota has created this system which uses O*NET for career exploration and job searching.

- **Brainbench.com, Avilar.com, StaffCV.com, and Skillsnet.com**—all use O*NET data in their occupational information and data systems.

A.2.11 Emerging Skill Needs and Looking to the Future with Competency Models

O*NET has already played a key role in helping to identify new and emerging skill needs, as illustrated by the following example from California. An analysis of the multimedia and entertainment industries in California revealed a pressing need for a pool of talented and skilled 3-D computer artists and traditional animators. Using O*NET's survey data collection instruments and other material, California's Employment Development Department conducted an industry study, with the endorsement of the California Skillsnet Consortium, comprising

establishments and educators. As a result of O*NET data, human resources personnel modified local training and education initiatives to help fill the gap between industry needs and skills possessed by local workers. Training programs defined the skills and requirements for the evolving occupations of 3-D computer artists and traditional animators. State and local leaders forged important partnerships with local establishments, educators, Workforce Investment Boards, community-based organizations, and other stakeholders to meet industry demands.

DOL has identified industry and occupational competency models as a key resource in providing a framework for business and industry to clearly articulate their workforce needs. The O*NET Content Model and database provide a valuable resource for the development of reliable and valid competency models. In turn, these models form the basis on which curriculum developers and training providers develop objectives and outcomes to ensure that workers have the right skills. ETA plans to act as a broker of information in the area of competency models and skill standards development by promoting, supporting, and disseminating information. The information gathered through the O*NET Data Collection Program is expected to continue to support the effort to provide the workforce investment system partners with the tools they need to invest in human capital development.

A.2.12   Training Sources for O*NET Products and Uses

A number of federal and state training opportunities have been initiated in support of the O*NET products and tools. These programs address the training needs of a variety of O*NET users. Some examples follow:

- In the past, the O*NET Program launched a nationwide training effort to inform and train workforce development professionals about the value and uses of O*NET information and how to access O*NET resources. The Discover O*NET: The Language of Occupational Intelligence train-the-trainer program was provided to 38 states. More than 600 workforce development professionals have been certified as O*NET Trainers to deliver this training to colleagues within their state. The regionally delivered training session, O*NET Quick Start: How to Integrate O*NET in Local Workforce Development Initiatives, reached 181 system integration staff from 31 states. The Value of O*NET: Making WIA Work was a 1 ½-hour session delivered to 1,913 executive and managerial staff from 45 states.

- Currently, O*NET training support is also available on the Internet at http://www.onetknowledgesite.com/ to make the effort more efficient and expand the serviceable student population to include the business customer and educational community. Through the O*NET Academy at http://www.onetacademy.com/, students gain access to self-paced training on how to use the O*NET system and best practices for its application on the job. Over 900 participants have taken advantage of these Webinars. These Web sites provide collaborative tools and newsletters, as well as serving as a

forum for users and developers to share O*NET knowledge and gain new insights on user needs and customer satisfaction. The O*NET Academy has over 13,000 registered users.

- The John J. Heldrich Center for Workforce Development is located at the Edward J. Bloustein School of Planning and Public Policy at Rutgers, the State University of New Jersey. The Center teaches O*NET information in its Career Development Facilitator Curriculum, Working Ahead. This is an approved/credentialed 120-hour curriculum for teaching career counseling and guidance to front-line staff in workforce development, community organizations, and community colleges. Working in cooperation with a network of state departments of education and state career resource networks, the Heldrich Center is developing a training guide and student manual for training counselors and education staff in using the O*NET database as a career exploration tool by middle, high school, and college-level students.

- In addition, the Heldrich Center, along with the new Jersey State Employment and Training Commission and partners Electric Vine and NJBiz, has created http://www.njnextstop.org/, a Web site that provides students, parents, teachers, and job seekers with new research on in-demand skills for New Jersey's growth industries. The Web site contains links to the 10 reports that constitute the Ready for the Job series. These reports provide detailed insights into the skills, knowledge, and competencies workers need to succeed in important jobs in the New Jersey economy. The http://www.njnextstop.org/ site also links directly with O*NET OnLine to provide additional national information on the same issues.

- America's Career Resource Network is working to update the Improved Career Decision Making (ICDM) training program for counselors to integrate the O*NET Program into the ICDM curriculum. This curriculum has been used to train thousands of counselors each year since 1981 and marks an important effort by the Education and Labor departments to introduce the O*NET Program to more career counselors.

A.3   Uses of Information Technology (IT)

The O*NET Data Collection Program employs the latest in information technology (IT) systems and procedures to enhance the quality of the data, minimize the burden on the responding establishments and job incumbents, and reduce the overall cost of the data collection effort. For example, the program has electronic versions of survey questionnaires available via the Internet to sampled job incumbents. Many of the benefits of the paper questionnaires were replicated in the electronic questionnaires. Specifically, users are able to start and stop multiple times without losing data. They can return to their partially completed questionnaire at any time during the survey period and continue at the point where they left off. A respondent may also review and edit previous answers if needed. In addition, an on-screen meter keeps respondents informed of their progress through the questionnaire. The programming effort to develop online data collection is a one-time expense for a product and can be used for numerous data collection cycles.

Advances in Web technologies and security and the prevalence of access to Web browsers by establishments and employees have made Internet-based data collection both feasible and practical. Growth in Internet use in the past few years has been enormous and is expected to continue. The use of the Web questionnaire has increased, consistent with the increase in Internet use. For 2004, 15.8% of employee respondents used the Web questionnaire, a large increase over the 3.7% who responded via the Web during the 1999 pretest. The paper questionnaire cover continues to highlight the option of filling out the survey via the Web.

The paper and Web versions of the questionnaires were designed to be optimal for their respective modes of administration. The questionnaire design literature suggests that this is essential to reduce mode effects. That is, if each questionnaire is designed to minimize measurement error in its particular mode of interview, mode effects are also minimized. For example, in the paper version, multiple questions appear on a single page of the questionnaire. However, in the Web version, only one question appears per screen (although the respondent can navigate at will through the instrument). The literature on Web survey design (see, for example, Fuchs, 2002) suggests that one question per screen for Web surveys reduces measurement error and, thus, the effects of administration mode as well. This was the only important change necessary for the Web version since both instruments are self-administered. Further, to ensure comparability between the paper and Web responses, the formats and wordings of the questions and response categories for the two versions are identical.

An O*NET data collection Web page application has been developed to support and assist with the O*NET Data Collection Program (http://onet.rti.org). This site is divided into two major sections, the public and restricted access sections. The restricted access section is further subdivided into two areas, the online questionnaires area and the project management area.

Public Section

The goal of the public section is to support the establishment recruiting process. This section is accessible to the public without restrictions. The public section includes O*NET background information, endorsement letters, Frequently Asked Questions (FAQs), copies of the questionnaires, and links to other O*NET-related Web sites. The purpose of the public section is to provide establishments and sampled workers with readily accessible information about the data collection effort and uses of the data.

Restricted Access Section

This section contains sensitive information that is only available to certain populations, such as survey respondents, project managers, and data entry staff. This section is controlled by a user ID and password authentication scheme. The Web server includes a Secure Socket Layer (SSL) certificate to allow encrypted transmission of all information over the Internet. This is the

same technology used by e-commerce Web sites to secure credit card numbers. Also, no "cookies" are used. (A cookie is a piece of data given to a user's Web browser so that the browser will hand it back to the server or Web site upon subsequent requests.)

Online Questionnaire Area

This area contains online versions of the surveys, providing sample members with an alternative to pencil/paper, as described above. Only individuals who have been selected to participate in the survey have access to this area. Unique user IDs and passwords are assigned to each job incumbent by a central office computer system at the time they are selected into the sample; their name or other personally identifiable information is not obtained. The ID and password are provided to the sample member with other survey materials. The Web site confirms the validity of the ID and password and verifies that a completed survey form has not already been received before allowing access to the online questionnaire area.

Once entering this portion of the site, respondents are:

- informed that participation in the survey is voluntary.
- assured their survey responses will remain confidential.
- limited to seeing only the questionnaire they have been asked to complete.
- permitted to stop at any point and continue responding later.
- permitted to skip questions they choose not to answer.
- permitted to go back and review/change previous responses.

On the last page of the survey, respondents confirm that they have completed the questionnaire, then exit from the questionnaire area of the site and are thanked for their participation. Their user ID is automatically deactivated at this time. Any further attempts to log in will not be possible, as the system recognizes this user as having completed the survey.

The database containing the survey data is not accessible via the Internet; it resides on a server inside the contractor's firewall. The Web data collection application encrypts and transmits data from the respondent's computer into the survey database. Only program staff, operating from inside the firewall, have access to the survey database.

Project Management Area

This area contains data collection management reports and information. Access accounts for this area are created for managers of the O*NET Data Collection Program. This portion of the Web site serves as an intranet for the O*NET Data Collection Program, facilitating communication among data collection staff and DOL staff. Production reports are posted nightly and include summaries of the progress of establishment recruiting, questionnaire shipment and

receipt, and overall data collection status. Additional applications include a document library that allows designated data entry staff to make changes and edits to documents used in the data collection effort. This document library is the central repository for these documents, eliminating ambiguity and confusion about the validity and currency of changing documents. The project management area of the Web site reduces the cost of the data collection effort.

Data Collection Utilities

A number of enhancements have been made to the Case Management System (CMS) that allow greater flexibility and effectiveness in the communications between the contractor's staff of Business Liaisons and points of contact (POCs) in the sample establishment. For example, visual cues (icons) were added to the CMS, allowing the Business Liaisons to prioritize and customize their approach for certain establishments. The icons are used to indicate if Spanish questionnaires exist for an O*NET-SOC occupation, if the establishment is part of the military or federal government, or if the establishment contains an O*NET-SOC occupation that is particularly difficult to contact. Another enhancement was the ability to do ad hoc package modifications based on O*NET-SOC occupations. By customizing the packages for certain O*NET-SOC occupations, the POCs receive targeted materials that help communicate the data collection mission. These and other enhancements have improved the study's effectiveness and efficiency.

Integrated Inventory System

In an effort to help manage supplies (envelopes, brochures, questionnaires, etc.) associated with data collection, an inventory tracking system was developed and deployed. The inventory application is integrated with the CMS so that as orders are placed, reports are updated to show the expected inventory. As stocks run low, the staff is alerted to the need to replenish supplies. The system provides a means to reconcile physical and expected inventory. As a result, the system has improved the efficiency of ordering, storing, and shipping of data collection materials.

O*NET-SOC Warning/Shutdown System

An application has been deployed that monitors the ordering and completion of questionnaires by O*NET-SOC occupation. The application alerts project staff when the number of questionnaires reaches a certain threshold. The application provides the flexibility to control the number of questionnaires mailed for each O*NET-SOC occupation and helps to minimize the burden on establishments and reduce the costs associated with recruiting establishments and mailing questionnaires.

A.4   Efforts to Identify Duplication

To avoid duplication and save on cost, several portions of the O*NET Content Model are provided from existing data sources. Specifically, as discussed in **_Section A.1_**, the domain of Occupational Characteristics—including information on industries, job opportunities, and pay—is provided through links to existing labor market information databases. Information about occupational licensing, certifications, national industrial skill standards, and related instructional programs is provided from existing sources, such as the Manufacturing Skills Standards Council, the National Retail Federation, and several Web sites including http://www.careertools.org/certification and http://www.acinet.org/acinet/lois_start.asp.

The exhaustive reviews of existing labor market and occupational information conducted by the Advisory Panel and the Department of Labor's DOT Review staff, and subsequent current research, identified no other comprehensive, valid, and reliable sources that could be used for the data items included in the O*NET database.

The development of the O*NET Program has also involved staff and advisors with many years of experience in labor market and occupational information who are familiar with existing data sources. In fact, many existing systems that provide detailed occupational information are actually using information based on O*NET data or the predecessor DOT.

The few existing sources with similar measures are too limited to be used in the O*NET database. Some existing sources are valid and reliable—for example, information from the Office of Personnel Management and the Department of Defense—but are not comprehensive, as they represent only those jobs in federal civilian employment or the military.

There are also some private sources of job analysis information; however, they are based on job analyses conducted on an as-needed basis rather than on a representative sample of employers and workers. They are therefore limited in their coverage and are not representative of the entire workforce. Furthermore, these analyses are not comparable because they do not use the prescribed O*NET common language to describe occupational requirements; it is not practical to combine them because they include dissimilar components. Finally, these private data sources are not available to the general public.

A.5   Efforts to Minimize Burden on Small Establishments

All sizes of establishments are represented in the O*NET estimates for most occupations. For some occupations, the targeting strategy used in selecting an efficient sample may lead us to omit some small establishments from the sampling frame, but this occurs for only a minimal number of occupations. This is done when it is clear that sampling small establishments will

greatly reduce the efficiency of the data collection or when it is clear that incumbents from small establishments are not working in the mainstream of the occupation.

Given that establishments of all sizes need to be represented in the samples for most occupations, we have included specific design provisions to not overly burden small establishments. For example, *Exhibit A-4* shows the distribution of establishments by number of employees on the Dun and Bradstreet (D&B) list used as the sampling frame for O*NET data. The exhibit also shows the expected distribution of the O*NET sample of establishments by number of employees. *Exhibit A-4* shows that O*NET sampling selects small establishments at a much lower rate than they occur in the population. While 85.9% of establishments employ less than 25 employees, the O*NET sample will consist of only 34.5% of such small establishments. On the other hand, large establishments (with 250 or more employees) will make up 31.8% of the O*NET sample but make up only 0.5% of all establishments. Thus, the O*NET sample relies more heavily on large establishments in order to reduce the burden on small establishments with few employees. The disproportionate sampling of large and small establishments is properly accounted for in the analysis weighting, resulting in statistically consistent estimates.

Exhibit A-4. Distribution of Frame and Sample Establishments by Employment Size

Number of Employees	Total Frame Establishments[a]	Frame Distribution	Actual Distribution of O*NET Sampled Establishments[b]
1–4	8,582,520	63.9%	22.1%
5–9	1,685,093	12.6%	6.0%
10–24	1,263,304	9.4%	6.4%
25–49	485,964	3.6%	14.9%
50–99	262,553	2.0%	9.7%
100–249	142,882	1.1%	6.3%
250–499	34,583	0.3%	17.9%
500–999	13,570	0.1%	7.9%
1,000–4,999	7,635	0.1%	5.6%
5,000+	477	0.0%	0.4%
Unknown	942,252	7.0%	2.8%
Total	**13,420,833**	**100%**	**100%**

[a] Data based on October 2004 D&B frame of establishments.
[b] Data based on distribution of prior O*NET samples which used the D&B frame. Future O*NET samples will be designed in a similar manner.

In addition, data collection procedures place lower burden on small establishments than on large establishments. When a small establishment is selected, it is likely to employ fewer of the targeted occupations and have a lower number of employees working in the occupations.

Thus, a POC at a small establishment generally spends less time preparing sampling lists and distributing questionnaires than a POC at a large establishment, which is more likely to employ several of the targeted occupations with a large number of employees working in the occupations.

A.6   Consequences of Collecting the Information Less Frequently

A.6.1   Consequences of No Data Collection

The O*NET database is the most comprehensive source of occupational information in the U.S. No other similar comprehensive, reliable and valid source is available.

If O*NET data are not collected, U.S. citizens and establishments will have few options that meet their needs for occupational information. The use of O*NET data by employers, job seekers, students, educators and workforce development specialists supports a well-functioning U.S. labor market and workforce investment system. Since updates to the Dictionary of Occupational Titles (DOT) were discontinued over a decade ago, the usefulness of this source of information lags further and further behind the rich and recent nature of O*NET data. For example, information technology, particularly related to the Internet, has revolutionized many business practices and related occupations in the last decade. With ongoing data collection, the O*NET Program is capable of capturing information on this, as well as other, important new and emerging technologies.

Users who rely on the DOT are finding that the information is continually less satisfactory. (More than 10,000 of the 12,762 occupations in the DOT were last updated in 1977.) In addition, unlike the DOT, O*NET-SOC occupations conform to the Standard Occupational Classification (SOC), permitting O*NET Skills domain information to be linked to and analyzed along with sources of information on current occupational employment and trends, wages, and demographic data. Users of the O*NET database find that it provides a standard data structure, conforms to the SOC, and covers many more occupational and worker characteristics than are found in the DOT. Its electronic format is freely accessible, either through O*NET OnLine (http://online.onetcenter.org) or as a download from the O*NET Resource Center (http://www.onetcenter.org).

The initial 3.1 version of the O*NET database was populated with information derived from the DOT. Thus far, updated data have been published for 380 O*NET-SOC occupations. An additional 100 occupations are scheduled for publication in December 2005. At this time data are actively being collected on 330 occupations. Additional data releases are planned through 2009, completing the O*NET-SOC occupations currently in data collection, updating selected

high-growth occupations, and releasing new data on new and emerging occupations. The consequences of discontinuing data collection would be that the millions of users who rely on O*NET data for career decisions, for educational programming, and for work in human resources or workforce development would be utilizing portions of information that are out of date and incomplete. A dynamic and progressive U.S. economy requires continuous improvement to the data on which so many decisions are based. Millions of people are currently using O*NET information and the numbers continue to expand as public agencies and private developers integrate O*NET data into their systems and products. The O*NET database provides valid, reliable and current occupational information that is crucial to a strong U.S. workforce.

A.6.2   Frequency of Data Collection

We are requesting a 3-year extension for the period spanning FY2006–2008. This extension will provide for the completion of data collection for the remaining 330 occupations currently on the schedule in the FY2006–2008 period, updating selected high-growth occupations, and performing data collection activities for new and emerging occupations. O*NET database updates are scheduled to occur twice a year in 2006 and once a year thereafter to incorporate newly collected information on recently surveyed occupations. A schedule for data analysis is provided in *Section A.16*. The schedules for data collection and analysis are subject to annual appropriations.

If data were collected less frequently, the currency of some data would become questionable, especially for occupations that are changing as a result of new technologies. The focus of data collection on high-growth and new and emerging occupations reflects the need to provide current information in a demand-driven economy that is rapidly changing.

A.7   Special Circumstances

The study will be conducted in a manner consistent with the guidelines in Title 5, Section 1320.9 of the CFR. There are no special circumstances that might require deviation from the guidelines.

A.8   Consultation Outside the Agency

Public comment and expert review comments for this 3-year OMB clearance package extension were solicited during June and July 2005. *Exhibit A-5* lists expert reviewers who have been consulted in the development of this submission package. Comments from these experts and the public have been incorporated, as applicable, into appropriate sections of this Supporting Statement.

Exhibit A-5.   Expert Reviewers

Name	Organization	Telephone Number
Department of Labor, not in Employment and Training Administration		
Shail Butani	Bureau of Labor Statistics	202-691-6347
Alan Dorfman	Bureau of Labor Statistics	202-691-7278
Michael Pilot	Bureau of Labor Statistics	202-691-5700
George Stamas	Bureau of Labor Statistics	202-691-6350
Non-Government		
John Campbell	University of Minnesota	612-625-9351
Michael Campion	Purdue University	765-494-5909

The Federal Register notice (see *Appendix D*), initiating the 60-day period for public comment, was published on June 3, 2005. Comments were received from eight people. Their comments are summarized below, along with the response from the Department of Labor, Employment and Training Administration (ETA).

- **Comment:** An e-mail message was received from "Jean Public" stating that she opposes the project, that we have the data already, and that it could be done every 5 years instead of every year.

  Response: ETA believes that the commenter's concerns have been adequately addressed in this Supporting Statement (see especially *Sections A.1, A.2, A.4, and A.6*) and that no further response to this comment is needed.

- **Comment:** A comment was received from a vendor of an occupational information product based on enhanced data from the *Dictionary of Occupational Titles (DOT)*. The firm's product is intended for use to determine if individuals are eligible for disability payments (SSI and/or SSDI) from the Social Security Administration.

  Response: Use of O*NET data is extensive among the user communities cited in *Sections A.2.7 through A.2.12*. There is some use of O*NET information in vocational rehabilitation efforts; use is limited in disability determination, since DOT information is still cited administratively in the Social Security Administration regulations governing the process. This commenter questions the value of O*NET information based on the perspective that its own product, based on the DOT model, meets the needs for disability determination. We have documented that many user communities value and make extensive use of O*NET information.

- **Comment:** In response to the question "Is the data collection necessary?" the California Labor Market Information Division (LMID) said, "Yes, current occupational data are needed from incumbents and subject matter experts to validate worker requirement ratings currently in the O*NET database and [to] capture changing tasks and technologies." The commenter went on to say that LMID regularly uses O*NET data for skills gap analysis, for identifying transferable skills in selected occupations, and in special studies.

  Response: ETA agrees with this view of the value of the O*NET data.

- **Comment:** The California LMID commented that the estimate of 30 minutes per questionnaire is generally accurate based on their experience. However, workers with low reading or English language skills will take longer.

  Response: The project the LMID refers to used earlier versions of the O*NET questionnaires that took significantly longer to complete than the current O*NET questionnaires. The 30-minute estimate is an average, based on timing data collected during development of the current questionnaires and the 1999 pretest. Some respondents will take less time and some more time, but we have not had any complaints about that estimate from any of the more than 100,000 respondents to date.

- **Comment:** The California LMID commented that the estimated burden time for employers of 70 minutes is unrealistic, based on their experience collecting O*NET data in California. The LMID listed the tasks the employers were expected to perform in these projects and concludes that "two to four hours might be a more realistic estimate of employer burden, depending on the number of occupations and how readily the job titles in an industry translate to O*NET titles."

  Response: The protocol followed by California to collect O*NET data in several pilot projects was somewhat different and more labor-intensive for the employer than the current data collection protocol. The derivation of the 70-minute estimate is shown in ***Exhibit A-6***. The time estimates for the POC contacts are based on observations of the Business Liaisons actually making contacts. The time estimates for the POC to construct the roster (average of 20 minutes) and distribute the questionnaires (average of 15 minutes) are based on (1) discussions with the Business Liaisons, who are in frequent contact with the POCs during this process, (2) the fact that on average we select only 1.8 occupations per

establishment and 3.7 incumbents per occupation, and (3) the cap we have placed on POC burden by limiting the number of occupations selected in an establishment to no more than five and the number of selected employees to no more than 20.

- **Comment:** In response to ETA's question in the Federal Register notice, "What will enhance the quality, utility, and clarity of the information to be collected?" the California LMID commented that "A constantly changing workplace and its accompanying technology warrants regular updating of ratings on job requirements."

  Response: ETA agrees.

- **Comment:** In response to ETA's question about how to minimize the burden of the collection of information on respondents, the California LMID commented that electronic collection techniques "will reduce paper use, decrease postage cost, and reduce employer time needed to coordinate collection of data."

  Response: ETA agrees. Our use of such techniques is described in *Section A.3*.

- **Comment:** Five respondents objected to having to switch to the O*NET coding system from the Dictionary of Occupational Titles (DOT) system for reporting purposes for the Work Opportunity and Tax Credits (WOTC) program. Two commenters were from state WOTC offices; three were from commercial firms.

  Response: OMB recently approved a new data collection instrument—ETA Form 9058, "Certification Workload and Characteristics of Certified Individuals, Work Opportunity and Welfare-to-Work Tax Credits" Report. The prior version of this form required reporting the occupational characteristics of WOTC-certified individuals by nine primary occupational categories utilized in the DOT. The DOT was last updated by DOL in 1991 and has since been superseded by the O*NET system. The O*NET system is based on the 2000 Standard Occupational Classification (SOC) system, which is required by OMB for all federal collection of statistics relating to occupations. The new version requires that the occupational characteristics of WOTC-certified individuals be reported in 1 of the 23 O*NET-SOC major groups. The form identifies these as O*NET categories rather than O*NET-SOC or simply SOC categories.

  Some of the entities who will be required to report on the new ETA Form 9058 would prefer to remain with 9 occupational categories rather than have to expand

to 23 categories. Rather than directing these comments to the Federal Register notice announcing the new form, some of these entities responded to the Federal Register notice regarding the O*NET Data Collection.

We would like to clarify that the requirement to use the SOC classification when federal agencies collect occupational statistics is the relevant principle here and that the O*NET data collection does not impact in any way the requirements for Form 9058. Therefore, these comments are not germane to the O*NET Data Collection request.

We have brought this issue to the attention of the appropriate officials within ETA, and they will provide appropriate clarification to affected individuals through upcoming guidance and technical assistance to the field on the tax credit program.

A.9   Payments or Gifts to Respondents

A.9.1   Establishment Method

Because POCs are the only link with the O*NET respondents, they must be fully committed to the data collection process. They are our representative within the establishment who communicates the importance of the O*NET Program. One of the lessons learned in the early waves of the O*NET Program is that incentives are necessary in order to adequately motivate POCs to complete the O*NET functions.

Among the activities POCs are asked to carry out are the following:

- reading the introductory package to become familiar with the purpose of the O*NET Data Collection Program and the role of a POC;

- seeking permission within the company, as necessary, to participate in the O*NET Data Collection Program;

- making a roster of all employees at the location who work in up to five different occupations;

- participating in a sampling process that selects up to 20 employees from these occupations and maintaining this sample roster for future reference;

- distributing questionnaires to the sample persons within the company and addressing their questions and concerns about the survey; and

- distributing follow-up materials to employees, including thank you/reminder cards, replacement questionnaires, and e-mail requests for cooperation.

In exchange for their cooperation in these activities, POCs are given the O*NET Toolkit for Business and a desk clock with the introductory mailing and a framed Certificate of Appreciation in the questionnaire mailing. Although the cost of the Certificate of Appreciation is only a few dollars, its perceived cost is much greater according to anecdotal evidence and feedback from the Business Liaisons. The Certificate is personalized with the name of the POC and signed by a high-ranking DOL official. The combined cost of this gift and the O*NET clock is approximately $10.

The Toolkit also has much higher perceived value than its actual cost. It is a packet of information about the O*NET Program that managers can use for human resource planning, including a guide for writing job descriptions. The Toolkit also provides the establishments with guides to using O*NET data and O*NET OnLine, as well as case scenarios to illustrate how O*NET data can be helpful in human resource and other management applications. Thus, the Toolkit serves a second important role in that it helps employers understand the value of the O*NET Data Collection Program.

The main purpose of these incentives is to (1) establish a trusting relationship with the POC, (2) provide an inducement for the POC to read through the materials in the introductory package, and (3) create a sense of obligation for the POC to follow through with the early stages of the O*NET data collection process through sampling.

Incentives for the Employee

In keeping with what has been done in previous waves, each employee is offered a prepaid incentive of $10 to ensure that a high percentage of those job incumbents complete and return the questionnaire.

Monetary incentives have the greatest potential impact when the respondent has to exert some special effort, such as taking a test or filling out a multi-item questionnaire. The incentive serves to encourage respondents to complete a task requiring higher levels of involvement and commitment than the typical one-time, face-to-face interview. While the O*NET questionnaires are not tests, the cognitive demands they place on respondents are quite similar in that the respondents are asked to make assessments of the requirements of their job. Using various scales, workers must reflect on their current job to make these judgments. The monetary incentive is instrumental in impressing upon the respondent the importance of this rating task. Respondents who perceive the rating task as important are less likely to make hasty assessments that lack adequate consideration, thus improving the reliability of the data.

In addition, the monetary incentive for respondents is important because they are encouraged to complete the questionnaire on their own time rather than on the job. This

minimizes the burden on employers and improves the quality of the data because a nonresponse by workers who were "too busy" to complete the questionnaire on the job could produce a bias reflecting on-the-job performance levels.

The monetary incentive has the potential to at least partially offset its cost through efficiencies created in the data collection process as a result of higher response rates. For job incumbent respondents especially—while they are not viewed as a difficult-to-reach population in the usual sense—considerable effort and cost is expended to identify and reach them through the sampling process. The respondent represents a worker in a specific occupation in a specific establishment in a specific industry. The expense of reaching that particular respondent justifies the cost of a monetary payment to ensure a high rate of response. With regard to the size of the employee incentive, payment amounts were evaluated in the pretest to determine the optimal means to maximize the response rate. Based on those data, a $10 cash incentive has been used in past waves and will continue to be used in future waves.

POC Incentive Experiment

As described in **Section B.4** and **Appendix G**, an experiment to test providing an additional incentive to the POC was conducted in 2004. The purpose of the experiment was to examine the effects of offering POCs who agree to participate a prepaid $20 incentive, in addition to other material incentives described in **Section B.2**.

The results from this experiment provided no evidence that the incentive improves cooperation rates at the establishment level or the employee level. The POC appears just as likely to initially agree to participate in the O*NET data collection with the $20 incentive as without it. This may be explained by the fact that the POC is initially presented with a fairly extensive array of motivating materials and gifts in the early stages of the recruitment process. It is conceivable that the $20 incentive seems to be a small incremental benefit to the POC compared with all the other benefits that are part of the POCs participation in the survey. Further, since most POCs conduct their O*NET work with the approval of their supervisors and, presumably, on company time, any additional monetary gift may be viewed as unnecessary by the POCs and their employers. In addition, there was no evidence of any cost savings from using the monetary incentive.

Thus, it was concluded that the incentives currently being offered to the POC are adequate for producing good response rates. The additional monetary incentive neither increased response rates nor achieved greater efficiency in the data collection. The decision was made to terminate the POC incentive experiment and any further use of monetary incentives for the POC.

A.9.2   Incentives for Association Members

The burden to respondents in the Association method very closely resembles that for Establishment method employee respondents. (See **Section B.2.3** for a description of the Association method.) Therefore, the incentive is $10 per association member.

A.9.3   Incentives for Occupation Experts (OEs)

Occupation experts (OEs) will provide data for a small subset of occupations. Each OE is offered a monetary incentive commensurate with that offered the incumbent respondent: $10 per questionnaire. As each OE is asked to complete all four domain questionnaires, the incentive totals $40 per OE. Details of OE data collection methodology are provided in **Section B.2.4**.

A.10 Assurance of Confidentiality

All participants in this data collection effort are assured through written materials of the confidentiality of their answers. These materials have been reviewed and approved by the contractor's Institutional Review Board, in accordance with federal regulations governing the protection of human research subjects (45 CFR 46). In addition, very little personal information about the respondent is collected, and there is no identifying information, such as name or place of employment, on the survey.

The contractor for the data collection task, RTI International, has extensive experience in protecting and maintaining the confidentiality of respondent data collected from surveys. RTI International has drawn upon its experience in designing the data collection procedures incorporated in this program to ensure confidentiality.

The collection of survey data is at the employee level at selected establishments and within recruited associations. Letters to employees and experts from the study project director and the Department of Labor, along with the Participant Information Sheets for Employees, contain essential program information that enable the employee to make an informed decision regarding his/her voluntary participation in the data collection effort. Examples of all materials provided to employees are included in **Appendix F**.

As noted, employees are asked to complete their questionnaires on their personal time, not company time. This enables the employee to select a comfortable and private setting, if desired, in which to complete the questionnaire. The employee mails the completed questionnaires directly to RTI International by using a reply envelope supplied by the O*NET Data Collection Program along with the questionnaire. The individual responses are processed using a study ID number. All O*NET Data Collection Program staff are required to sign a

confidentiality pledge that assures each respondent that the confidentiality of responses to the questionnaire will be maintained. Only authorized staff have access to the completed instruments and data files. The completed and processed questionnaires are stored in a secure document control area until federal authorization has been granted to destroy them. All computer files, including those associated with the control system, are password-protected.

The Internet-based system that allows employees to report data electronically has restricted access including a user ID and password authentication scheme for respondents. The Web server includes a SSL certificate to allow encrypted transmission of all information over the Internet, the same technology used by e-commerce sites. The database containing the survey data is not accessible via the Internet; it resides on a server inside the RTI firewall. Only O*NET Data Collection Program staff have access to the master survey database.

A.11 Questions of a Sensitive Nature

Only one question in the O*NET questionnaire might be considered to be of a sensitive nature. In the Background section, the survey asks respondents if they consider themselves to have a disability using the disability questions developed for the 2000 Census of Population. Completion rates for this item indicate that the vast majority of participants (97%) elected to complete the question.

The O*NET sampling strategy randomly selects participants at the individual level. The disability question, along with the demographic questions, provide descriptive information about the sample of respondents. In addition, these data may allow for some broad comparisons with the characteristics of the general population working in the occupation, using information from the 2000 Census.

Respondents to the O*NET survey are informed that responding to all questions, which includes disability status and the other demographic characteristics, is voluntary. They complete the survey on their own time, in a private setting if they choose. No identifying information, such as the respondent's name or place of employment, is recorded on the questionnaire.

A.12 Estimates of Annualized Hour Burden

As noted previously, there are three protocols for O*NET data collection—the Establishment method, the Association method, and the Occupation Expert (OE) method. By far, the Establishment method is the most used of the protocols. The Association method is primarily used for occupations for which data collection was previously attempted using the Establishment method. The OE method is used for a small number of occupations for which the other two methods are not expected to be feasible. At this time, it is not possible to determine the number

of occupations that will eventually be completed using the Association method, but it is expected to be a small number. Hence, except for those occupations that we anticipate using the OE method, we have budgeted all other remaining occupations using the Establishment method since any occupation completed by the Association method will require less burden.

The Establishment method uses a two-stage sample with establishments selected at the first stage and employees selected at the second stage. Thus, there are burden hours associated with establishments and with employees. During the establishment stage, a POC is identified for each establishment; the POC conducts the activities required to complete the study. *Exhibit A-6* presents the assumed average burden, in minutes, for the POC's activities; these averages were obtained from our experience with the last 4 years of O*NET data collection. When estimating the total establishment burden, we estimated the number of establishments that will complete each activity, multiplied by the average burden based upon the last 4 years of O*NET data collection experience, and summed across the activities.

Exhibit A-6.   Establishment POC Burden Assumptions per Activity

Activities	Number of Responses	Average Burden per Response (in Minutes)
Verification Calls to Initial Contact at Establishment	1	2
Screening Call to POC	1	3
Initial Recruitment Call to POC	1	12
POC Creates Occupation Lists for Sampling	1	20
Call by POC to Sample Workers	1	10
POC Distributes Questionnaire Packets	1	15
Follow-up Calls to POC	4	2

Selected employees under the Establishment method will complete one questionnaire requiring an average of 30 minutes of effort. OEs will complete all applicable domain questionnaires, requiring an average of no more than 2 hours of effort.

Exhibit A-7 displays the estimated number of sampling units, the estimated burden hours, and the estimated cost to respondents for participating. For FY2006, establishments are estimated to expend 11,823 burden hours and employees are estimated to expend 12,798 burden hours, for a total of 24,621 burden hours. Likewise, for FY2007, establishments are estimated to expend 5,962 burden hours and employees are estimated to expend 7,680 burden hours, for a total of 13,642 burden hours. Finally, 4,786 burden hours are estimated for establishments in FY2008, and 5,688 burden hours are estimated for employees, for a total of 10,474 burden hours. The decline across fiscal years results primarily from the declining number of occupations to be

completed in each successive year (see **Section A.16**) and the reduction from 4 to 3 domain questionnaires for high-growth and new and emerging occupations (see **Section A.1.3**).

Exhibit A-7.   Estimate of Hour and Cost Burden by Fiscal Year

	FY2006		FY2007		FY2008	
	Sampling Units	Hours of Burden	Sampling Units	Hours of Burden	Sampling Units	Hours of Burden
Establishment Burden						
No. of Establishments Contacted	29,333		14,792		11,875	
No. of POCs Contacted	24,346		12,277		9,856	
No. of POCs Participating	7,908		3,988		3,201	
Total Establishment Burden Hours		11,823		5,962		4,786
Employee Burden						
Establishment Method Employee Respondents	22,556	11,278	12,321	6,160	8,897	4,448
Occupation Expert Method Respondents	760	1,520	760	1,520	620	1,240
Total Employee Burden Hours		12,798		7,680		5,688
Total Burden Hours		**24,621**		**13,642**		**10,474**
Respondent Cost						
Establishments[a]		$401,611		$202,524		$162,586
Employees[b]		$234,712		$140,857		$104,325
Total Respondent Cost		$636,323		$343,381		$266,911

[a] Assumed hourly rates: $33.97 FY2006–2008
[b] Assumed hourly rates: $18.34 FY2006–2008

O*NET Establishment method data collection has been designed to minimize the burden on the selected establishments. These features include the following:

- Establishments are asked about no more than 10 occupations each, with questioning terminated once five, or sometimes fewer,[3] occupations are identified at an establishment.
- Establishments are only asked to complete rosters of employees for the five or fewer occupations identified.
- Establishments are selected no more than once within a 12-month period.

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[3] Some occupations are expected to have a large prevalence in certain establishments. In this situation, these occupations are counted twice for purposes of sample selection.

- No more than 20 employees are selected from an establishment across all of its selected occupations.
- If an occupation proves difficult to complete using Establishment method data collection, the alternative Association or OE methods are used.

A.13 Annual Reporting Burden Cost

Exhibit A-7 also displays the cost burden by fiscal year. The cost burden was estimated using average wage rates obtained from the July 2003 National Compensation Survey: Occupational Wages in the United States. The average wage per hour for private industry and state and local government was $17.75, which was inflated to a December 2004 hourly wage rate of $18.34 using the Employment Cost Index. This is the wage rate used for estimating the employee cost burden. Given that the POC will often be a human resources manager, the July 2003 wage rate of $32.87 for Personnel, Training, and Labor Relations Managers was inflated to $33.97 hourly wage rate for December 2004 for estimating the establishment cost burden.

The exhibit shows that the combined establishment and employees total cost burden is $636,323 for FY2006, $343,381 for FY2007, and $266,911 for FY2008. As with the burden hours, the decline in burden cost results from the declining number of occupations to be completed in each successive year (see *Section A.16*) and the reduction from 4 to 3 domain questionnaires for high-growth and new and emerging occupations (see *Section A.1.3*).

There are no respondent costs for capital or start-up, or operations, maintenance, and purchase of services. There are no costs to the employers, POCs, or sampled employees other than the time it takes them to participate in the survey.

A.14 Estimates of Annualized Cost to Government

The estimated average annual cost to the government for the O*NET Data Collection Program for FYs 2006, 2007, and 2008 is $6.4 million, $5.1 million, and $4.6 million, respectively. These estimates include all direct and indirect costs of conducting the sampling, data collection, and analysis activities of the O*NET Data Collection Program.

A.15 Reasons for Program Changes or Adjustments Reported in Sections A.13 and A.14

Exhibit A-8 presents a comparison of the projected burden for FY2006–2008 with the annual average burden approved for FY2003–2005. The projected total annual burden hours and costs for FY2006 and beyond are considerably less than the FY2003–2005 annual averages. The reduced burden for FY2006–2008 results primarily from the reduced number of occupations (200 vs. 100) that will be updated each year (see *Section A.16*) and from the reduced number of

domain questionnaires (4 vs. 3) to be completed by incumbents from high-growth and new and emerging occupations (see *Section A.1.3*).

Exhibit A-8.   Comparison of Hour and Cost Burden Between FY2003–2005 and FY2006–2008

	Annual Average FY2003–2005[a]		FY2006		FY2007		FY2008	
	Sampling Units	Hours of Burden	Sampling Units	Hours of Burden	Sampling Units	Hours of Burden	Sampling Units	Hours of Burden
Establishment Burden								
No. of Establishments Contacted	34,539		29,333		14,792		11,875	
No. of POCs Contacted	30,152		24,346		12,277		9,856	
No. of POCs Participating	16,753		7,908		3,988		3,201	
Total Establishment Burden Hours		25,259		11,823		5,962		4,786
Employee Burden								
Establishment Method Employee Respondents	16,228	8,114	22,556	11,278	12,321	6,160	8,897	4,448
Occupation Expert Method Respondents	—		760	1,520	760	1,520	620	1,240
Total Employee Burden Hours		8,114		12,798		7,680		5,688
Total Burden Hours		**33,373**		**24,621**		**13,642**		**10,474**
Respondent Cost								
Establishments[b]		$800,723		$401,611		$202,524		$162,586
Employees[c]		$135,664		$234,712		$140,857		$104,325
Total Respondent Cost		$936,387		$636,323		$343,381		$266,911

[a] Annual averages approved by OMB for FY2003–2005
[b] Assumed hourly rates: $31.70 FY2003–2005 and $33.97 FY2006–2008
[c] Assumed hourly rates: $16.72 FY2003–2005 and $18.34 FY2006–2008

A.16 Time Schedule, Publication, and Analysis Plans

The major components of the O*NET Data Collection Program include sampling, data collection operations, and analysis. *Exhibit A-9* provides the expected schedule for annual data analysis cycles and data publications.

Exhibit A-9.   Data Analysis and Publication Schedule

Activity Description	Schedule
Year 2005	
Analysis Cycle 4 completes	2nd Quarter 2005
Update Database (100 O*NET-SOC occupations)	2nd Quarter 2005
Analysis Cycle 5	1st Quarter 2005–4th Quarter 2005
Update Database (100 O*NET-SOC occupations)	4th Quarter 2005
Year 2006	
Analysis Cycle 6	3rd Quarter 2005–2nd Quarter 2006
Update Database (100 O*NET-SOC occupations)	2nd Quarter 2006
Analysis Cycle 7	1st Quarter 2006–4th Quarter 2006
Update Database (100 O*NET-SOC occupations)	4th Quarter 2006
Year 2007	
Analysis Cycle 8	3rd Quarter 2006–2nd Quarter 2007
Update Database (100 O*NET-SOC occupations)	2nd Quarter 2007
Year 2008	
Analysis Cycle 9	3rd Quarter 2007–2nd Quarter 2008
Update Database (100 O*NET-SOC occupations)	2nd Quarter 2008
Year 2009	
Analysis Cycle 10	3rd Quarter 2008–2nd Quarter 2009
Update Database (100 O*NET-SOC occupations)	2nd Quarter 2009
Year 2010	
Analysis Cycle 11	3rd Quarter 2009–2nd Quarter 2010
Update Database (100 O*NET-SOC occupations)	2nd Quarter 2010
Year 2011	
Analysis Cycle 12	3rd Quarter 2010–2nd Quarter 2011
Update Database (100 O*NET-SOC occupations)	2nd Quarter 2011

A.16.1   Tasks Conducted for Each Analysis Cycle

In this section the approach to data cleaning and the analyses to be performed are discussed. While these are the planned analyses, there is rich potential for these data to provide information to continuously improve the O*NET Data Collection Program and the data collection instruments and to inform the field of job analysis. For example, the results of the various reliability analyses may suggest the need for further investigation of the data obtained from particular domain items, or from certain occupations. Additional analyses might also be done to explore the correlation between domain items, as well as to examine the ability of the ratings to discriminate between occupations.

Data Cleaning

Paper questionnaires are manually and machine-edited so that completely blank questionnaires are dropped; responses to items that should have been skipped are blanked out; multiple responses are blanked out; and codes indicating missing data, multiple responses, and legitimate skips are inserted. Codes for legitimate skips and missing responses are also inserted in the records for questionnaires obtained through the Web. In addition, an electronic check is conducted to detect duplicate questionnaires from the same respondent.

Identification and Evaluation of Anomalous Cases

Analyses of the ratings are based on the assumption that raters were qualified, willing, and able to engage in the rating tasks. This is accomplished by requiring each case to first pass through a series of machine edits using prescribed eligibility criteria, including having at least one task rated important and having at least 50% of the domain questionnaire items completed. Cases not meeting these criteria are excluded from the analysis file. Cases with certain questionable characteristics are flagged in this editing process, and analysts review these cases to determine their completion status. All cases are flagged for review for which the respondent (1) indicated in the "global match" item that the target O*NET-SOC occupation description did not at all describe his/her own job, and (2) rated fewer than one-third of the tasks as important. Three analysts independently review the titles of these cases to determine if they appear to have any likelihood of belonging in the O*NET-SOC occupation. If a case does not belong, it is removed from further analysis. If, in the judgment of the analysts, there is a reasonable chance that the case belongs in the O*NET-SOC occupation, it is sent to the next stage of review.

Finally, cases that pass the machine edits and the analyst review are subjected to a deviance analysis designed to identify cases that are outliers relative to other cases in their occupation. The deviance analysis involves two procedures: a statistical procedure to quantitatively identify potential outliers, and an analyst review of these potential outliers to make the final decision for each case. Cases that do not pass the analyst review are deemed deviant within their occupation and are removed from the dataset. The cases passing all data cleaning criteria are used to create the estimates for publication.

Compute Sampling Statistics

Basic sampling weights are applied to the data to make inferences to the population of incumbents for each occupation. These weights are computed as the inverses of the overall selection frequencies and the selection probabilities for each selected establishment and each individual participant. The analysis weights for the eligible sample units are adjusted to compensate for unit nonresponse for both establishments and employees. In order to maximize

comparability of O*NET estimates with estimates from other federal sources, the final sample weights are also ratio-adjusted to occupation estimates obtained from the OES survey.

Sampling errors are computed. The analysis weights used in the sampling error computations, as noted above, have been adjusted for nonresponse and are consistent with the complex sampling design.

Calculation of Descriptor Values and Reliability

For each occupation, the means and standard error of the ratings for each descriptor are calculated along with the 95% confidence interval around the mean. Estimates with small sample sizes or questionable precision are flagged and recommended for suppression if any of the following conditions are true:

- The sample size is less than 10.
- The variance is 0 and the sample size is less than 15.
- The relative standard error is greater than 50%.

A.16.2   Other Analyses

Inter-rater Reliability and Agreement

Inter-rater reliability and agreement is assessed with three different analyses. The first two measure reliability in terms of the covariation among ratings, while the third analysis reflects rater agreement. The intraclass correlation coefficients (ICCs) for each item across all occupations are computed. These results allow us to compare respondent rating variance within an occupation with respondent rating variance across occupations. In addition to the ICCs, we also calculate the mean inter-rater correlations (Pearson r's) between all pairs of raters within each occupation. Finally, to assess the absolute difference among ratings of each item within each occupation, we calculate an average deviation index for each item within each occupation. For any given item and occupation, the average deviation index measures the average extent to which each individual rating deviates from the item mean. The purpose of the ICC analyses is to confirm that the variance of raters for particular items within an occupation is much less than the variance of the items' ratings across occupations. The inter-rater correlations and average deviation indexes indicate whether there are differences among respondents' ratings within each occupation, in both the covariance of ratings within occupations and absolute agreement among ratings within occupations. Some differences in ratings within occupations are expected because O*NET-SOC occupations comprise a range of different jobs in most cases.

Each of the reliability analyses conducted (rater, standard errors) are influenced by the number of respondents, and we have found that the O*NET data collection methodology includes a sufficient number of respondents in each occupation to ensure reliability.

Create Occupation Database

The O*NET database is scheduled to be updated twice a year in 2005 and 2006, and once a year in subsequent years. Each update will include data for those occupations collected and analyzed during the previous 6-month period. Thus, a database update includes occupations from multiple data collection waves, depending on the number of prior waves for which analysis was completed that year. For each occupation collected, the newly calculated means data replace existing analyst-based data in the database. Metadata are provided to users regarding when the data were collected and any other pertinent information that will assist the users in interpreting the data. If elements in the questionnaires have been changed since the previous database update, an analysis is performed to define the impact on the existing database. At this time, updates to the O*NET database are scheduled to continue through 2008, at which point the entire O*NET database will have been updated. Beginning in 2008, new information for high-growth and new and emerging occupations will be published. This is subject to annual budget levels for the O*NET Data Collection Program that would allow data collection to proceed as proposed.

The O*NET database is designated with a version number denoting each update, e.g., from O*NET 4.0 to O*NET 5.0. The database is developed and administered using the Oracle database management system. Once the Oracle database is updated, it is used to generate the database for public release as a series of flat text files. It is accessible to the public via the O*NET Program Web site at http://www.onetcenter.org/.

A.17 Display of Expiration Date

The expiration date will be displayed on the cover of the survey questionnaires.

A.18 Exceptions to Certification Statement

There are no exceptions.

Exhibit A-10. Publications Referencing O*NET

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B. Collections of Information Employing Statistical Methods

B.1 Sampling Universe, Sampling Methods, and Expected Response Rates

B.1.1 Introduction

A multiple-method data collection approach for creating and updating the O*NET database has been developed to ensure completion of all occupations. The primary source of information for the database is a survey of establishments and sampled workers from within selected establishments. This primary source of information is referred to as the *Establishment data collection method*. Under this approach, incumbents are sampled in their workplaces using a two-stage sample design, with establishments selected in the primary stage and employees in the secondary stage. Additional methods include random sampling from purposively selected association member lists (*Association method*) and selecting appropriate occupation experts (OEs) who can supply the needed information for an occupation (*Occupation Expert*, or *OE*, *method*).

In general, the Association method will be used to supplement responses received from incumbents in occupations that are difficult to find using the Establishment method. A dual-frame adjustment will be made to the sampling weights to adequately account for the coverage overlap between the two sources of collected data. The OE method is used for occupations whose incumbents are difficult to find or reach via the Establishment and Association data collection methods.

Section B.1.2 describes the statistical methods being used for Establishment method data collection, while the OE and Association methods are described in *Sections B.1.3* and *B.1.4*, respectively.

B.1.2 Establishment Method

B.1.2.1 Sampling Universe, Design, and Methods

Limited information regarding an occupation is available before that occupation is placed in Establishment method data collection. Therefore, the O*NET sampling methodology is designed to take advantage of empirical information learned during data collection to help identify industries in which particular occupations are employed. This methodology minimizes the number of establishments that must be contacted to select the sample of employees for an occupation. It uses a stratified two-stage design in which businesses (the first stage) are selected with probability proportional to the expected number of employed workers in the specific occupations being surveyed, and a sample of workers (the second stage) is selected in the

occupations within the sampled businesses. Occupations are fielded in waves, where a wave includes a set of primary occupations (usually around 50). The primary occupations are those targeted for data collection in a wave. Each wave is designed to contain several groups of similar primary occupations that may be found in similar industries. The sampling steps described below are carried out for the *primary* occupations that are associated with a wave. Once the sets of industries to be targeted in a wave are identified, additional *secondary* occupations that are likely to be found in these industries are added to the wave and allocated to the selected establishments. If a selected establishment employs less than the maximum number of allowed primary occupations, secondary occupations are included for the establishment to efficiently utilize each cooperating establishment.

The sample of establishments for each wave is scheduled to be fielded in four sub-waves. The sub-waves are identified as X.1, X.2, X.3, and X.4, where *X* represents the set of primary occupations and the number following represents the order in which the sub-waves occur. In this case, X.1 is the first sub-wave and X.4 is the last. All occupations in the wave are potentially included in each sub-wave; however, each sub-wave sample consists of a different sample of establishments. Any occupation that requires additional respondents is included in the next sub-wave. The first sub-wave of establishments uses the Occupational Employment Statistics (OES) data to determine the industries most likely to employ the occupations and the sample is designed to cover a wide range of industries. As each sub-wave establishment sample is selected, the experience gained from the previous sub-waves is used to more effectively target the sample to industries in which the occupations have been demonstrated to be found.

This methodology has two major benefits. First, it allows time for empirical data to be amassed and used to maximize the efficiency of the sample by not sampling from industries that have been determined to have only a small chance of having the occupation of interest. Second, it minimizes the oversampling of any one occupation. Since the establishment sample size for a particular set of occupations is spread over four sub-waves, if an occupation is found more easily than expected, the sample for future sub-waves can be used on other occupations in the wave rather than used unnecessarily on this particular occupation.

The Establishment method sample selection process for each sub-wave sample involves multiple phases of sample selection in which establishments are selected during the first phases of selection and employees during the later phases. This sample selection process is diagrammed in *Exhibit B-1*. To summarize, the sample selection process proceeds as follows:

Phase 1: Create Occupation-by-Industry Frame Matrix. A sampling frame of establishments, covering over 13 million establishments in the United States, is constructed from the Dun & Bradstreet (D&B) list of U.S. establishment locations. Several commercial list frames

were evaluated, and the D&B frame was the least costly source of data that has the essential establishment-level information, including industry type and location-specific employment. This frame is updated quarterly to ensure the most current and accurate establishment information possible is used.

Exhibit B-1.   Summary of Sample Selection Process

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┌─────────────────┐   ┌─────────────────────┐   ┌─────────────────┐
│  Occupation by  │   │ Dun and Bradstreet  │   │    List of      │
│  Industry Data  │   │ List of             │   │  Occupations to │
│  from BLS's     │   │ All Establishments  │   │  Be Sampled in  │
│  OES Program    │   │ in U.S.:            │   │     Wave        │
│                 │   │ Contains Employment │   │                 │
│                 │   │ and Industry        │   │                 │
│                 │   │ Information         │   │                 │
└─────────────────┘   └─────────────────────┘   └─────────────────┘
         ↘                     ↓                      ↙
              ┌──────────────────────────────┐
              │  Phase 1: Create Occupation-  │
              │  by-Industry Frame Matrix     │
              └──────────────────────────────┘
                            ⇓
              ┌──────────────────────────────┐
              │  Phase 2: Evaluate Experience │
              │  Data and Select              │
              │  Industry Groups              │
              └──────────────────────────────┘
                            ⇓
              ┌──────────────────────────────┐
              │  Phase 3: Select              │
              │  Establishments from Frame    │
              └──────────────────────────────┘
                            ⇓
              ┌──────────────────────────────┐
              │  Phase 4: Assign Occupations  │
              │  to Establishments            │
              └──────────────────────────────┘
                            ⇓
              ┌──────────────────────────────┐
              │  Phase 5: Select Employees    │
              └──────────────────────────────┘
                            ⇓
              ┌──────────────────────────────┐
              │  Phase 6: Assign Employees    │
              │  to Questionnaire Types       │
              └──────────────────────────────┘
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Current occupation-by-industry employment estimates, generated by the OES survey conducted by the U.S. Bureau of Labor Statistics (BLS), are merged with the D&B frame. Data from previously completed sub-waves, if available, are used to supplement the occupation-by-industry frame matrix concerning which industries are most likely to employ an occupation. These data are used to determine which industries to target for each occupation being sampled in a particular wave. In general, occupations are clustered into the sample waves in a manner that maximizes the similarity of industries in which the occupations are found. This increases the

efficiency of the sample because each establishment is more likely to employ more than one of the target occupations.

Phase 2: Evaluate Experience Data and Select Industry Groups. The occupation-by-industry frame matrix and experience data are then reviewed by staff knowledgeable of the occupations to determine from which industries the sample of establishments will be selected. In determining which industries to target for each occupation, the most efficient and representative industries are identified that cover at least 50% of each primary occupation under consideration.[4]

After industries are selected for each occupation, they are classified into one of three groups: "high," "medium," or "low." This classification helps to further target industries in which an occupation is likely to be found. For example, if it is believed that establishments in a particular industry or industries have a very good chance of containing a particular occupation, then the industry is classified as "high." Similarly, industries with a low chance of having an occupation are classified as "low." To maintain efficiency in the sampling process, as well as to cover at least 50% or more of the incumbents working in each occupation, the sample is designed to oversample the "high" industries and undersample the "low" industries for each occupation.

Phase 3: Select Establishments from the Frame. The goal is to select establishments proportional to a composite size measure (CSM)[5] that efficiently combines the number of employees working at each establishment from the subject occupations. However, it is not possible to directly access this information for the entire D&B frame of establishments. Thus, the following three-step approach is used:

- Determine the number of establishments to select from each industry.
- Select a large simple random sample of establishments from each industry. The CSM is then created from the number of employees working in the subject occupations at each selected establishment.
- Sub-sample those establishments proportional to their CSM.

The selection of establishments is stratified by industry groups (high, medium, and low) defined in Phase 2 above and by the number of employees working at the establishment. Large establishments and establishments in the "high" industry group are sampled at a higher rate than small establishments or establishments in the "low" industry group. In addition, by selecting establishments with probability proportional to their CSM, those establishments employing a higher proportion of the occupations of interest have a greater chance of being selected into the

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[4] The justification for this rule is discussed at the end of this section.
[5] For more information on the use of composite size measures, please see Folsom, Potter and Williams (1987).

sample. The combination of stratification and proportional-to-CSM sampling makes the establishment sample more efficient since establishments with a higher likelihood of employing the occupations of interest are given a greater chance of being in the sample than are establishments where it is not as likely to find the occupations.

Phase 4: Assign Occupations to Establishments. The next phase is to randomly assign up to 10 occupations to each establishment for potential employee sampling. Among those establishments selected in Phase 3, each establishment has 10 (or fewer) occupations randomly selected with probability proportional to the product of the sampling rate for the occupation and the establishment's estimated number of employees within the occupation. After removing the initial set of certainty occupations[6] (and recording the number of times these occupations are selected, which could be greater than 1), sampling is performed without replacement, and the order in which occupations are selected is retained. The result of this process is a list of occupations that is randomly ordered proportional to their "value" to the O*NET wave under consideration. Therefore, those occupations that are rare and those that are believed to be highly prevalent in an establishment have a greater chance of appearing near the top of the ordered list. Both the set of 10 (or fewer) occupations and the number of times each occupation was selected (which can be greater than 1 for certainty occupations) for each establishment are loaded into the Case Management System (CMS).

Phase 5: Select Employees. In this phase of selection, a Business Liaison sequentially asks the point of contact (POC) for the approximate number of employees working in each occupation on the list of occupations assigned to the establishment. Each time the Business Liaison receives a non-zero response, the number is entered into the CMS and it is automatically determined if the maximum number of occupations (at most 5) for that establishment has been reached. If so, then the POC is not asked about any additional occupations and is asked to create rosters of all employees working at the establishment in the selected occupations. The approach is set up so that when the maximum number of occupations is reached, the resulting sample of occupations is a random sample with known probabilities of selection. In addition, the burden on the POC is minimized by never asking the POC about more than the minimum number of occupations necessary. A random sample of employees is then selected from each occupation roster. To further minimize the burden on an establishment, no more than 8 employees are selected from any single occupation, and no more than 20 employees are selected across all occupations from an establishment.

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[6] Certainty occupations are those with a selection frequency greater than 1 and are included in the sample of occupations from an establishment with certainty.

Phase 6: Assign Employees to Questionnaire Types. The final phase of selection is the random assignment of selected employees to domain questionnaire types. The survey is designed to collect data from at least 15 respondents in each occupation to each of four different questionnaire types (Skills, Generalized Work Activities, Work Context, and Knowledge). One of these four questionnaire types is randomly assigned to each employee.

Employee Sample Size

A key issue in sample design is the level of precision required in the resulting data and the cost of producing a particular level of precision, in terms of both dollars and respondent burden. The O*NET sample design has been developed to provide results with a level of precision that should be adequate to meet the needs of general purpose users (those seeking information at the occupation level). Consistent with the procedures used by the O*NET Program since 2001, an occupation is considered complete and ready for inclusion in the final O*NET database when at least 15 respondents are obtained for each of the four questionnaire domains.

The current sample size goal is based on the final technical report of Peterson, Mumford, Levin, Green, and Waksberg (1997), which presents means and standard deviations for both 5- and 7-point scales for the descriptors within Skills, Knowledge, Generalized Work Activities, Abilities, and Work Styles. Statistics were computed separately using the reported data for each of six occupations. The data in these tables indicate that when 15 responses per descriptor are obtained, the mean values for virtually all of the 5-point and the 7-point descriptors have 95% confidence intervals that are no wider that plus or minus 1 to 1.5 scale points for all occupations.

Exhibit B-2 displays the half-width of 95% confidence intervals (CIs) for means of 5- and 7-point scales by sample size from Analysis Cycle 4 of the O*NET data collection program. The data in *Exhibit B-2* are taken from 220 5-point scales and 109 7-point scales measured on each of 100 occupations. The exhibit shows the 95th, 90th, 75th, and 50th percentiles of the half-width of the confidence intervals. Across all sample sizes, nearly all of the scale means have 95% CIs that are no wider than plus or minus 1.5 scale points. For those scale means based upon sample sizes between 15 and 25 respondents, over 95% of the 5-point scales and over 75% of the 7-point scales have 95% CIs that are no wider than plus or minus 1.5 scale points. Also, 90% of the 7-point scales have 95% CIs that are no wider than plus or minus 1.7 scale points.

Further, Mumford, Peterson, and Childs (1997, p. 3-8) cited Fleishman and Mumford (1991) as support that variation of 1 to 1.5 scale points on a 7-point scale "is typical of that found for well-developed level scales." Thus, setting a minimum employee sample size of 15 (with many occupations achieving a larger sample size) will generally satisfy this requirement. Also, Peterson, Mumford, Levin, Green, and Waksberg (1997) state that 15 to 30 incumbents typically

provide sufficient inter-rater reliability for describing occupations, given the types of measures the O*NET Program uses to describe occupations.

Exhibit B-2.   Half-width of 95% Confidence Intervals

Percentile	5-Point Scales		7-Point Scales	
	Sample Sizes of 15 to 25	All Sample Sizes	Sample Sizes of 15 to 25	All Sample Sizes
95th	+/– 1.2	+/– 0.9	+/– 1.9	+/– 1.5
90th	+/– 1.0	+/– 0.7	+/– 1.7	+/– 1.2
75th	+/– 0.8	+/– 0.5	+/– 1.3	+/– 0.8
50th	+/– 0.6	+/– 0.3	+/– 0.9	+/– 0.6

In order to minimize both the cost of conducting the O*NET Data Collection Program and the burden placed on the public, the number of employees selected into the sample and the number of returned questionnaires is monitored carefully on a daily basis. Once it becomes clear that at least 15 respondents for each domain questionnaire from an occupation will be available, terminating further sampling of employees for that occupation is considered. This step is taken because of the difficulty of estimating the rate at which employees will be encountered when employee sampling for an occupation is begun. It is sometimes the case that employees from an occupation are much easier to locate than anticipated and the desired number of responding employees is quickly overshot, thus using resources inefficiently and placing excess burden on the public. When early termination of sampling for an occupation is considered, the distribution of the selected and of the responding employees is reviewed by industry of employment, size of establishment (number of employees), and geographic region of the country. If the achieved sample approximates the distribution that would be expected by these three variables, then further sampling from the occupation in question is terminated. If not, sampling is continued until adequate representation in the sample is achieved across the three variables (industry, size, and location).

Establishment Method Sampling Universe

The central goal of the O*NET Data Collection Program is to provide data for each of 810 occupations[7] that are prevalent to varying degrees in different industries in the U.S. Estimates from this program are designed to assist users in distinguishing among occupations and are not necessarily designed to capture all of the subtle differences between jobs in different industries. With this in mind, the O*NET sampling universe for each occupation is generally a subset of all employees in the occupation working in the U.S. This subset, or target population

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[7] Additional new and emerging occupations may be added as they are identified to include occupations that have developed since the list of then existing occupations was developed.

for the occupation, is defined using two criteria: (1) its workers represent a majority of job incumbents in the occupations, and (2) data among this set of establishments can be gathered with reasonable efficiency.

Previous O*NET experience has shown that trying to build a sampling frame that covers 100% of an occupation is inefficient and poses undue burden on some establishments. For example, the occupation-by-industry matrix data suggested that a very small number of bricklayers could be found in establishments in the "hospital" industry. However, asking a POC within a hospital about bricklayers led to some difficulties. In addition to being unduly burdensome, often the Business Liaison lost credibility when a POC was asked about occupations not likely to be associated with his or her establishment, such as bricklayers in hospitals. Additionally, there may be a number of false negative responses from the establishment POC because the POC simply does not know if some rare occupations exist in his/her establishment. This would be particularly true for larger establishments. To address these concerns, the target population is defined so that it includes establishments in industries and size categories in which the occupation is most prevalent.

When less than complete population coverage is allowed, it is possible that some bias might be introduced into the study estimates. To determine if there was a potential for bias in the O*NET estimates due to restricting the target population for an occupation, a sensitivity study was conducted. The study considered 18 occupations for which data collection had been previously completed and for which at least 80% population coverage had been achieved. The linkages of these 18 occupations to industries were then reconsidered, and reduced sets of industries were determined that covered 50% of workers in each occupation. Estimates for a selected set of outcomes were then computed from the reduced data set simulating estimates at the 50% level of population coverage. When comparing the original data with at least 80% coverage to the reduced data with 50% coverage, no apparent systematic shifts of the estimates toward higher or lower values were observed. The vast majority of the differences between the two sets of estimates was very small, and the differences were symmetrically distributed around zero. The pattern was what would be expected if the differences occurred at random, unrelated to the level of coverage. It appears that there was no systematic bias introduced using a population coverage minimum of 50% for each occupation. Consequently, O*NET Establishment method data collection maintains a population coverage of at least 50% for each occupation.

B.1.2.2   Weighting and Estimation

After the raw data are edited and cleaned, weights are constructed for each establishment and employee respondent to reduce the bias and variance of the estimates due to factors such as nonresponse, undercoverage, and the complex sample design. Weighted estimates of means and

percent distributions are then calculated for each survey item. Finally, variances are produced for all estimates and the precision of the estimates analyzed. The process is repeated for each analysis cycle.

The following section discusses the development of weights for establishments, occupations, and employees sampled using the Establishment method. The section after that discusses estimation for means, proportions, and their variances.

Weighting

Estimates generated from O*NET survey data collected by the Establishment method are computed using analysis weights in order to reflect the combined effects of the following:

- probabilities of establishment selection
- probabilities of occupation selection
- probabilities of employee selection
- adjustments due to multiple Establishment samples
- under- and overcoverage of the population caused by frame errors
- nonresponse at both the establishment and the employee levels.

The final employee-level analysis weights are computed as the product of a number of weight factors. These factors reflect the probabilities of selection from the multistage sample design, as discussed in *Section B.1.2.1,* as well as appropriate nonresponse, ratio, and multiple sample adjustments.

The starting point for each of these stages is the inverse of the probabilities of selection at each stage (establishment, occupation, and employee)—often called the *base sampling weight* for the stage. The base sampling weight accounts for the unequal probabilities with which establishments, occupations, or employees are selected at each stage. At each stage, the weights are:

- adjusted for nonresponse, and
- trimmed to reduce the impact of very large weights.

Additionally, at the employee selection stage only, the weights are
- adjusted for the multiple waves of sampling, and
- ratio-adjusted to match external population distributions.

To reduce potential bias on the estimates caused by unit nonresponse, an adjustment is applied to the sampling weights at both the establishment and the employee levels. Unit nonresponse adjustments are computed using a response propensity modeling approach

described in Folsom and Singh (2000). The Folsom and Singh modeling approach is a generalization of constrained logistic models first suggested by Deville & Särndal (1992). This approach is used to adjust for nonresponse because it has been shown to be more effective at correcting for nonresponse bias than the more commonly used weighting class approach. The increase in effectiveness comes from the ability to incorporate a greater number of correlates of nonresponse in the modeling approach than would be possible with traditional weighting class methods. This is particularly important for the O*NET survey because the respondent sample sizes within an occupation are typically small (minimum 60 respondents). The response propensity modeling approach allows data to be combined over occupations to form the appropriate adjustments for unit nonresponse at the occupation level.

The base establishment weights are adjusted for nonresponse using constrained logistic regression models that contain different combinations of the following variables:

- Industry division
- U.S. Census division
- establishment size
- headquarters/branch type
- number of occupations asked about in an establishment
- urban vs. rural location
- time zone.

In addition, the employee weights are adjusted for nonresponse using a constrained logistic regression model developed using the same list of variables used for the establishment nonresponse adjustment, with the addition of occupation-specific indicator variables to the model. Adding occupation indicators to the model maintained the correct sum of weights for each occupation, while using data across occupations for the other variables in the model to improve the adjustment.

Final estimates are produced based on the pooled samples from all waves that contribute to an analysis cycle. Because each of these samples is taken from frames that represent overlapping portions of the same target population of interest, employee weights are adjusted to correct for the pooling of the multiple samples; otherwise, the occupation's population would be counted multiple times in the pooled sample. Multiple-frame adjustments to the employee weights are applied proportional to the employee sample sizes from each sampling wave in the overlapping portions of the target populations. This method of adjusting estimates produces the minimum variance for the pooled estimate provided the population variance is approximately the same from each wave's target population.

A ratio weight adjustment is included so that weight sums by occupation agree with other federal data sources, specifically estimates derived from the OES program, which is conducted by the U.S. Bureau of Labor Statistics. This adjustment can improve estimates by correcting for undercoverage or overcoverage of the occupation by the weighted sample and can reduce the variance of estimates. In general, the ratio adjustment factor for an occupation is computed by dividing the OES employment total for that occupation by the sum of the weights computed prior to this stage for all employees in the occupation. This is done separately by industry division for each occupation so that the weighted distribution of workers by industry in the O*NET data matches the industry distribution in the OES.

The combination of weight adjustments and inverse probabilities of selection from a multistage sample design can lead to weights that are very large or very small relative to the weights for other sample units. These unequal weights may increase the variance of estimates, and in cases in which the potential for increased variance is very large, it is often desirable to trim the extreme weights (both large and small). Although trimming weights can introduce bias in the estimates, the variance reduction it achieves is generally assumed to be larger in magnitude—thereby yielding estimates with a smaller net mean squared error. Extreme weights at both the establishment and the employee levels are trimmed to reduce their impact on the estimated variances. The total amount of weight trimmed is proportionally allocated back to other respondents in the same group to maintain the total estimated population size.

Estimation

For every Task questionnaire item and domain questionnaire item (including the Background items), a weighted estimate of either the mean or of the percent distribution is computed for each response category. A discussion of the estimation process is provided below.

Means. Using data collected from the final set of respondents for each occupation, as well as the final sample weight discussed in the previous section, weighted means are computed for the following items:

- all items from the Skills, Work Activities, Work Context, Knowledge, and Work Styles sections of the domain questionnaires
- importance items from the Task questionnaire.

For each item, if respondents did not provide an answer to a particular question, they are not included in either the numerator or the denominator of the estimated mean. No item imputation was conducted to complete the datasets, and no value was assumed for these item nonrespondents for estimation purposes. This decision was made because, as discussed in *Appendix E,* item nonresponse is very low for this study.

Percent Distributions. Similar to the estimates of means discussed above, data collected from the final set of respondents are used for each occupation in combination with the final sample weight discussed above to compute the weighted percent response distribution for the following items:

- all items from the Work Context and Education and Training sections of the domain questionnaires
- Relevance and Frequency items from the Task questionnaire.

Variance Estimation. Variances are estimated using the first-order Taylor series approximation of deviations of estimates from their expected values. These design-based variance estimates were computed using SUDAAN® software (Research Triangle Institute, 2001). These estimates properly account for the combined effects of clustering, stratification, and unequal weighting—all of which are present in the O*NET data. These estimated variances were used to estimate both the standard errors associated with the mean/percent and the confidence intervals. Standard error estimates and 95% confidence intervals are included with all estimates of means and proportions.

B.1.2.3　Expected Response Rates

As described in **Section A.1.5**, data collection had been completed for a total of 27 waves as of September 30, 2004. These waves consisted of 69,149 sampled establishments and 118,254 selected employees. The overall response rate was 70% for establishments and 65% for employees. Although these response rates compare favorably with comparable studies (see **Section A.1.5**), methods to enhance the response rates still further are constantly being evaluated and implemented (see **Section B.3**).

B.1.3　Association Method

- For selected occupations, respondents are recruited from professional and trade association member lists, which is called the *Association method*. To be selected for O*NET data collection, an association must (1) represent the O*NET-SOC occupation in the nature of the work performed by its members, (2) contain a high percentage of the total occupational employment, and (3) be willing to provide a list of its members in usable form for an O*NET sampling frame. Professional associations, licensing authorities, and commercial companies are contacted for possible inclusion in the Association method.

The sample selection procedures vary across associations, depending on the type of information available about association members. In general, association lists are sampled using a single-stage, stratified, simple random sampling approach. Stratification by geographic location and occupation subspecialty is considered, as appropriate to the occupation.

For some occupations, obtaining the full desired respondent sample size by questionnaire type from appropriate associations is the most efficient approach, particularly if an association covers a high proportion of an occupation. However, in most cases, the Association method is used in conjunction with the Establishment method to complete an occupation that has proved difficult to locate through the Establishment method. For these occupations, the proportion of the sample selected using the Association method and the remaining sample selected using the Establishment method are combined using a dual-frame approach (Cochran, 1977, Section 5A.15). A question about membership in the association is included in the survey instruments. This allows for determination of the overlap between the Establishment and the Association method samples so that the sampling weights can be properly adjusted.

The Association method was first implemented in FY2004 for three occupations, all of which were in process at the end of the fiscal year.

B.1.4   Occupation Expert Method

The OE method is used to obtain the data for a number of occupations in which the Establishment and the Association methods are problematic. Examples include occupations with very low rates of employment, new and emerging occupations that do not yet have industry employment data, and those whose incumbents are in remote locations that are difficult to access. This method is therefore viewed as an alternative to establishment-based and association-based data collection that is designed to improve sampling efficiency. In the case of new and emerging occupations, the OE method will be the preferred method for data collection.

To decide which sampling method to use for each occupation, O*NET staff compare the advantages and disadvantages of each potential method. For each occupation, information on the predicted eligibility rate and the predicted response rates is used to quantify the efficiency of sampling the occupation through the Establishment method. The OE method is used for an occupation when it is determined that the Establishment and Association methods of data collection are not feasible and that an appropriate source of OEs exists. A random sample is selected from a list of the available OEs to prevent investigator bias in the final selection of OEs. At least 20 OEs complete all questionnaire types to ensure that at least 15 pass edit requirements and are available for analysis.

Through FY2004, the OE method was used to collect data for nine occupations. A total of 364 OEs were sampled, of which 271 were found to be eligible, and 247 of these participated, for an overall response rate of 91%.

B.2 Procedures for the Collection of Information

B.2.1 Introduction

This section describes data collection procedures and operations for the O*NET Data Collection Program. The next section describes operations for Establishment data collection, including a summary of data collection results. *Section B.2.3* describes Association method operations and data collection results. *Section B.2.4* describes OE operations and data collection results.

Data collection operations were conducted at the contractor's Operations Center in Raleigh, NC, and their Survey Support Department (SSD) in Research Triangle Park, NC. The Operations Center's Business Liaisons contacted sample business establishments, secured the participation of a POC, and worked with the POC to carry out data collection in target occupations. SSD staff mailed materials to the POCs and received and processed completed questionnaires that were returned. Both the telephone operations of the Business Liaisons and the mailout and questionnaire receipt operations of the SSD staff were supported by a case management system (CMS). Data entry software supported the keying and verification of incoming survey data.

B.2.2 Establishment Method

B.2.2.1 Operations Center Facility and Staffing

Data collection activities are housed in the O*NET Operations Center, located in Raleigh, NC. The facility includes the following:

- 38 Business Liaison work stations
- 4 Team Leader work stations
- 1 office for the Monitoring Coordinator
- 1 office reserved for visiting contractor or O*NET staff
- 1 office for the Operations Center Manager.

Usual operating hours for the Operations Center are Monday through Friday, 8:45 a.m. to 5:15 p.m., Eastern Time. Operating hours are extended during periods of unusually high workloads or when necessary to contact a high concentration of Pacific time zone businesses.

The Operations Center staff includes Business Liaisons, Team Leaders, a Monitoring Coordinator, and the Operations Center Manager, who report to the Data Collection Task Leader.

The Business Liaisons form the nucleus of the Operations Center staff. The number of Business Liaisons fluctuates somewhat, ranging from 24 to 38, depending upon workload. New

Business Liaisons are recruited and hired at various intervals in order to compensate for attrition and increases in workload. Business Liaison job candidates are carefully screened and evaluated by Operations Center management, using a job description and a set of criteria that include a minimum of 2 years of work experience in a call center or related work experience in a human resources department.

B.2.2.2   Case Management System

The O*NET Case Management System (CMS) is a Web-based control system that supports and monitors the data collection activities of the Business Liaisons, the mailout of informational materials and questionnaires, and the receipt of completed paper and Web questionnaires.

B.2.2.3   Questionnaires and Information Materials

The Establishment data collection protocol calls for each sampled worker to receive one of four randomly assigned domain questionnaires—Skills, Knowledge (which includes Education and Training and Work Styles), Generalized Work Activities, and Work Context. Each domain questionnaire also includes a Background section that asks a standard set of 11 demographic questions about the respondent. In addition, each worker receives a Task questionnaire specific to his/her occupation. Task questionnaires are developed initially through the extraction of task information from multiple sources located on the Internet. This questionnaire includes a definition of the occupation, a list of tasks, and space for the respondent to write in additional tasks. The respondent is instructed to indicate whether or not each task is relevant to his/her occupation and to rate each relevant task's frequency and importance. In subsequent updating efforts, task inventories are revised to reflect the new and most current information from respondents, including write-in tasks.

For all occupations, sampled workers also receive an occupation-specific Association Membership questionnaire. The questionnaire provides a list of associations related to the worker's occupation and asks the respondent to indicate whether he/she belongs to any of them. The respondent is also asked to write in any other associations to which he/she belongs. This information is collected in case it becomes more efficient to complete the occupation using the Association method.

Each sampled employee receives an integrated questionnaire consisting of the randomly assigned domain questionnaire and the Task and Association Membership questionnaires applicable to the employee's occupation. Questionnaires are custom-printed on demand for each sampled worker. In addition, workers are encouraged to complete their questionnaire online at the project's Web site in lieu of completing and returning the paper questionnaire. Example questionnaires are included in *Appendix A*.

In addition to the questionnaires, the Establishment data collection protocol includes a variety of letters, brochures, and other informational materials mailed to POCs and sampled workers. *Appendix F* contains examples of these project materials.

B.2.2.4   Data Collection Procedures

The data collection protocol is shown in *Exhibit B-3*. The steps of the protocol are described below.

Step 1 (Verification Call to the Receptionist). The Business Liaisons call each sampled business to determine whether the business is eligible (i.e., it is still in operation at the sampled address). The other component of the Verification Call is to identify the anticipated POC, who is knowledgeable about the types of jobs present in the establishment and to whom the Screening Call is placed.

Step 2 (Screening Call to the POC). The Business Liaisons next call (or are transferred to) the anticipated POC to see if the business has at least one employee in at least one of the occupations targeted for that establishment. If so, the following POC information is obtained:

- name and title of the POC
- U.S. Postal Service delivery address
- telephone number
- e-mail address (if available)
- fax number.

None of the Business Liaisons' conversations with the POC are scripted in advance. Instead, talking points are provided to guide the Business Liaisons' interactions with POCs. Business Liaisons are trained to listen and interact effectively and in a comfortable style, rather than read from a prepared script; therefore, reading off a computer screen is not encouraged. The Business Liaisons enter all information gathered during each conversation with a POC into the CMS.

Step 3 (Send Information Package). The Information Package is sent to the POC after the completion of the Screening call and contains more detailed information about the O*NET program. The following information is included in the Information Package:

- U.S. Department of Labor lead letter
- O*NET brochure
- project participation information sheet
- letter from contractor's project director

Exhibit B-3. Establishment Method Data Collection Flowchart

Step 1:

Verification Call to Receptionist

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Step 2:

Screening Call to the Point of Contact (POC)

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Step 3:

Send Information Package

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Step 4:

Recruiting Call to POC

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Step 5:

Sampling Call to POC

↓

Step 6:

Send Questionnaire Package

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Step 7:

Send Toolkit

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Step 8:

7-Day Follow-up Call to POC

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Step 9:

Send Thank You/ Reminder Postcards

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Step 10:

21-Day Follow-up Call to POC

↓

Step 11:

31-Day Follow-up Call to POC

↓

Step 12:

Send Replacement Questionnaires

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Step 13:

45-Day Follow-up Call to POC

- Selected Occupations List (SOL), providing title and descriptions of target occupations
- list of endorsing professional associations
- POC incentive (i.e., the O*NET desk clock).

Step 4 (Recruiting Call to the POC). The next call to the POC is made approximately 7 days after the Information Package is shipped, in order to give the POC adequate time to receive, read, and process the information. During the Recruiting call, the Business Liaison:

- verifies that the Information Package was received

- confirms that the POC is qualified to serve in the POC role

- reviews with the POC the ID Profiles for the target occupations to determine whether the establishment has any employees in those occupations

- if one or more target occupations are present, explains the O*NET program in greater detail, answers questions, and attempts to secure the POC's commitment to participate

- for participating establishments, explains the need for the POC to prepare a numbered list of employees' names for each identified occupation, for use in selecting a sample of employees

- sets an appointment for the Sampling call, allowing sufficient time for the POC to compile the occupation rosters. (In smaller businesses, the Sampling call is sometimes combined with the Recruiting call.)

Step 5 (Sampling Call to the POC). During this call, the Business Liaison obtains from the POC the number of names on each roster and enters the counts into the CMS, which selects the sample using preprogrammed random sampling algorithms. The Business Liaison then informs the POC which employees are selected for each occupation. The POC is asked to note the line numbers of the selected employees on his/her list(s) for later reference when distributing the questionnaires. For designated O*NET-SOC occupations with a high percentage of Hispanic employees, the Business Liaison also asks the POC if any of the selected employees should receive a Spanish version of the questionnaire instead of the English version. The language preference of each employee is then indicated in the CMS.

Step 6 (Send Questionnaire Package). After completion of the Sampling call, the employee packets are shipped to the POC for subsequent distribution to the sampled employees. As part of the same mailing, the POC receives a thank-you letter and a framed Certificate of Appreciation from the U.S. Department of Labor, personalized with the name of the POC and signed by a high-ranking DOL official. Each questionnaire packet contains a letter from the contractor's project director, the assigned questionnaire (including the domain questionnaire and the Task and Association questionnaires integrated into a single booklet), a return envelope, an information sheet for completing the questionnaire, and a $10 cash incentive. A Spanish

questionnaire is sent to any Hispanic employees whom the POC indicated during the Sampling call should receive this version. In addition, all employees in these O*NET-SOC occupations are informed through a bilingual notice included in the mailing that they have a choice of English or Spanish versions, and they are provided with a toll-free number to call if they would like to receive the alternate version.

Step 7 (Send Toolkit). Approximately 3 days after mailing the Questionnaire Package, the contractor also mails the POC the O*NET Toolkit for Business—a packet of information about the O*NET program that managers can use for human resource planning and preparation of job descriptions.

Step 8 (7-day Follow-up Call to the POC). Approximately 7 days after the shipment of the original questionnaire package to the POC, the Business Liaison calls to verify receipt of the mailing and to review the process for distributing the questionnaires to the selected employees. The Business Liaison also informs the POC of a forthcoming shipment of Thank You/Reminder postcards and asks him/her to distribute these to all sampled employees.

Step 9 (Send Thank You/Reminder Postcards). Following the 7-day follow-up call, the Business Liaison places an order for Thank You/Reminder postcards to be sent to the POC for distribution to all sampled employees.

Step 10 (21-day Follow-up Call to the POC). Approximately 21 days after the shipment of the original questionnaire package, the Business Liaison calls to thank the POC for his/her ongoing participation and to provide an update on any employee questionnaires received to date.

Step 11 (31-day Follow-up Call to the POC). Approximately 31 days after the shipment of the original questionnaire package to the POC, the Business Liaison calls to again thank the POC for his/her ongoing participation and to provide an update on any employee questionnaires received to date. At this time, the Business Liaison informs the POC of a forthcoming shipment of replacement questionnaires, which are to be distributed to any employees who have not yet returned the original questionnaire.

Step 12 (Send Replacement Questionnaires). Following the 31-day follow-up call, the Business Liaison places an order for the shipment of replacement questionnaires. These packages are ordered for any employees who have not yet responded. The replacement questionnaire package is very similar to the original one, with the exception of a slightly different cover letter and the absence of the $10 cash incentive. Using roster line information and/or employee initials provided by the Business Liaison during the 31-day follow-up call, the POC will then distribute the appropriate replacement questionnaire package to each nonresponding employee.

Step 13 (45-day Follow-up Call to the POC). Approximately 45 days after the shipment of the original questionnaire package to the POC, the Business Liaison places one final follow-up call to the POC to thank the POC for his/her assistance and to provide one final status report regarding employee questionnaires. If all questionnaires have been received at this point, the Business Liaison thanks the POC for his/her organization's participation. If questionnaires are still outstanding, the Business Liaison confirms receipt and distribution of the replacement questionnaire packets. This is the final step in the data collection protocol.

B.2.2.5 Mailout Operations, Questionnaire Receipt, and Processing

Orders for mailings of questionnaires and informational materials to support data collection are placed by the Business Liaisons and processed by data preparation staff. The CMS supports and monitors the entire process, including placing the order, printing on-demand questionnaires and other order-specific materials, shipping the order to the POC, and interacting with the U.S. Postal Service to track delivery of the order. Staff members follow written procedures in fulfilling orders, including prescribed quality control checks. They are also responsible for maintaining an adequate inventory of mailout materials and for inventory control.

Completed questionnaires returned in the mail are delivered to the contractor, where they are opened and batched and their barcodes scanned to update the CMS for receipt. The batches are then delivered to data entry staff, where the survey data are keyed and 100% key-verified. The questionnaire batches are then stored in a secure storage area. Data from the paper questionnaires are merged with the Web questionnaire data and readied for data cleaning routines.

B.2.2.6 Establishment Method Data Collection Results

Establishment data collection, which began in June 2001, is still under way. As of September 30, 2004, the contractor had completed data collection for 27 waves. The data collection results are summarized below:

Sampled establishments:	69,149
Eligible establishments:	58,832
Participating establishments:	41,125
Establishment response rate:	70%
Sampled employees:	118,254
Participating employees:	77,138
Employee response rate:	65%

B.2.3　Association Method Data Collection

Association method data collection is an alternate method of collecting information on occupation characteristics and worker attributes. In this method, persons who are job incumbents are surveyed, but their identification and selection is via a professional association (i.e., source organization) instead of an establishment. This method can be used in a dual frame approach along with the Establishment method to improve sampling efficiency – for example, for an occupation with low employment and wide dispersion across many industries.

The primary differences between the Association method and the Establishment method approach are as follows:

- In the Association method approach, Business Liaisons speak directly with the individuals completing the questionnaires; there is no POC.

- Association members are classified as either eligible or ineligible based on responses to the initial screening question.

- Once an Association member is deemed eligible, he/she receives one of the four randomly assigned questionnaire booklets directly, without going through a POC. The Association member also receives a $10 cash incentive.

B.2.3.1　Operations Center Facility and Staffing

The same facility used for establishment data collection—the Operations Center in Raleigh, NC—is also used for the AM work. Due to the small sample sizes and limited number of occupations, a subset of the Business Liaison staff is used to conduct AM data collection (subject to a requirement that at least two Business Liaisons must be assigned to each occupation).

B.2.3.2　Case Management System

The CMS that was developed to support OE method data collection is also used for Association data collection because the protocols are very similar and both are somewhat different from the Establishment method CMS. Like the Establishment method CMS, the OE/AM CMS is a Web-based control system that supports and monitors the data collection activities of the Business Liaisons, the mailout of informational materials and questionnaires, and the receipt of completed paper questionnaires.

B.2.3.3　Questionnaires and Information Materials

Association method questionnaires are the same as those used for Establishment data collection. Association method respondents are also offered the option of completing their questionnaire on the Web.

Association method information materials were developed from Establishment data collection method materials but were modified to reflect differences between the Association method and the Establishment method (direct contact with the respondent, identification through a named source organization, and reference to only one occupation).

B.2.3.4   Data Collection Procedures

The steps in the Association method data collection protocol closely follow those for establishments. The primary differences are the absence of Verification and Sampling calls. The former is inapplicable due to contacting a specific individual (versus an establishment). The latter is inapplicable due to not sampling an individual from a larger group of employees. Additionally, the Association method procedures allow for completing the Screening and Recruiting stages within one telephone call (given the involvement of only one respondent and, therefore, the absence of rosters and employee selection). All steps after the mailing of questionnaires follow the Establishment method's steps. The Association method protocol is shown in **Exhibit B-4**.

B.2.3.5   Mailout Operations, Questionnaire Receipt, and Processing

Association method mailout operations and questionnaire receipt and processing follow the same procedures described in **Section B.2.2.5**.

B.2.3.6   Association Method Data Collection Results

The Association method was first implemented in FY2004 for three occupations, all of which were in process at the end of the fiscal year.

Exhibit B-4. Flowchart of Association Method Data Collection Procedures

```
                    ┌──────────────────────────────┐
                    │          Step 1              │
                    │     AM Screening Call        │
                    └──────────────────────────────┘
                                   │
                                   ▼
                           ╱────────────╲
                          ╱   Does AM     ╲
                         ╱  appear to be    ╲──── No ────┐
                         ╲    eligible?     ╱            │
                          ╲               ╱              ▼
                           ╲─────────────╱            (Stop)
                                │ Yes
                                ▼
                    ┌──────────────────────────────┐
                    │          Step 2              │
                    │ Mail Information Package to AM│
                    └──────────────────────────────┘
                                   │
                                   ▼
                    ┌──────────────────────────────┐
                    │          Step 3              │
                    │     AM Recruiting Call       │
                    └──────────────────────────────┘
                                   │
                                   ▼
                           ╱────────────╲
                          ╱    Is AM      ╲
                         ╱   definitely     ╲─── No ────┐
                         ╲    eligible?    ╱            │
                          ╲               ╱             ▼
                           ╲─────────────╱           (Stop)
                                │ Yes
                                ▼
                           ╱────────────╲
                          ╱      Is       ╲
                         ╱      AM          ╲──── No ────────────┐
                         ╲    willing?      ╱                    │
                          ╲               ╱             Conversion effort
                           ╲─────────────╱                      │
                                │ Yes                           ▼
                                │                        ╱────────────╲
                                │               ┌────── ╱ Successful?   ╲── No ──►(Stop)
                                ▼               │        ╲             ╱
                    ┌──────────────────────────────┐     ╲───────────╱
                    │          Step 4              │  Yes
                    │ Mail Questionnaire Package    │
                    │         to AM                 │
                    └──────────────────────────────┘
                                   │
                                   ▼
                    ┌──────────────────────────────┐
                    │          Step 5              │
                    │  7-Day Follow-Up Call to AM  │
                    └──────────────────────────────┘
                                   │
                                   ▼
                    ┌──────────────────────────────┐
                    │          Step 6              │
                    │     Mail Postcard to AM      │
                    └──────────────────────────────┘
                                   │
                                   ▼
                    ┌──────────────────────────────┐
                    │          Step 7              │
                    │   21-Day Follow-Up Call      │
                    └──────────────────────────────┘
                                   │
                                   ▼
                    ┌──────────────────────────────┐
                    │          Step 8              │
                    │   31-Day Follow-Up Call      │
                    └──────────────────────────────┘
                                   │
                                   ▼
                    ┌──────────────────────────────┐
                    │          Step 9              │
                    │ Mail Replacement Questionnaire│
                    │          to AM                │
                    └──────────────────────────────┘
                                   │
                                   ▼
                    ┌──────────────────────────────┐
                    │          Step 10             │
                    │  45-Day Follow-Up Call to AM │
                    └──────────────────────────────┘
```

B.2.4 Occupation Expert (OE) Data Collection

OE data collection is another alternate method of collecting information on occupational characteristics and worker attributes that is designed to improve sampling efficiency. In this method, persons who are considered experts in the target occupation, rather than job incumbents, are surveyed.

The primary differences between the OE method and the Establishment method are as follows:

- In the OE approach, Business Liaisons speak directly with the individuals completing the questionnaires; there is no POC.

- Each selected OE is evaluated against a two-tiered eligibility screening. At the Screening stage, the Business Liaison asks the OE initial eligibility questions. If the OE meets the initial screening criteria, he/she receives an Information Package, followed by a Recruiting call. During the Recruiting stage, the Business Liaison asks the OE detailed screening questions.

- The eligibility criteria may vary by OE occupation.

- OEs are classified as either eligible or ineligible based on responses to the initial and detailed screening questions.

- Once an OE is deemed eligible, he/she receives a questionnaire package consisting of all four domain questionnaires, a Background questionnaire, and a Task questionnaire. The OE also receives a $40 cash incentive.

- There is no Web questionnaire option for OEs.

B.2.4.1 Operations Facility and Staffing

The same facility used for establishment data collection—the Operations Center in Raleigh, NC—is also used for the OE work.

B.2.4.2 Case Management System

The differences in the Establishment and OE data collection protocols necessitated the development of a separate CMS to support OE data collection. As noted above, this CMS is also used for Association data collection. Like the Establishment method CMS, the OE/AM CMS is a Web-based control system that supports and monitors the data collection activities of the Business Liaisons, the mailout of informational materials and questionnaires, and the receipt of completed paper questionnaires.

B.2.4.3 Questionnaires and Information Materials

OE questionnaires are very similar to those used for Establishment data collection. The notable difference is that OEs are asked to complete all four domain questionnaires, a

Background questionnaire, and the Task questionnaire. Also, the OE method does not currently offer a Web option (although developing a Web option for OEs is currently under consideration). Instead, paper questionnaires are bundled prior to shipping, with the order of the domain questionnaires randomized at the respondent level.

OE information materials were developed from Establishment method materials but were modified to reflect differences between the OE method and the Establishment method (direct contact with the respondent, identification through a named source organization, reference to only one occupation, multiple questionnaires, a higher incentive, and the absence of a Web option).

B.2.4.4 Data Collection Procedures

The steps in the OE data collection protocol closely follow those for establishments. The primary differences are the absence of Verification and Sampling calls. The former is inapplicable due to contacting a specific individual (versus an establishment). The latter is inapplicable due to not sampling an individual from a larger group of employees. Additionally, the OE procedures allow for completing the Screening and Recruiting stages within one telephone call (given the involvement of only one respondent and, therefore, the absence of rosters and employee selection). All steps after the mailing of questionnaires follow the Establishment method's steps. The OE protocol is shown in *Exhibit B-5*.

B.2.4.5 Mailout Operations, Questionnaire Receipt, and Processing

OE mailout operations and questionnaire receipt and processing follow the same procedures described in *Sections B2.2.5*.

B.2.4.6 Occupation Expert Method Data Collection Results

Data collection was undertaken for a total of 24 occupations through September 30, 2004. Of these, 9 were completed and 15 were still in process as of that date. The data collection results for the completed waves are summarized below:

Sampled OEs:	364
Eligible OEs:	271
Participating OE:	247
OE response rate:	91%

Exhibit B-5.   Flow Chart of the Occupation Expert Protocol

```
┌─────────────────────┐
│      Step 1         │
│  OE Screening Call  │
└─────────────────────┘
          │
          ▼
       ╱────────╲
      ╱ Does OE  ╲
     ╱ meet initial╲      ┌──────────┐
    ╱  eligibility   ╲───▶│   Stop   │
     ╲  criteria?    ╱     └──────────┘
      ╲            ╱
       ╲────────╱
          │ Yes
          ▼
┌─────────────────────────┐
│         Step 2          │
│ Mail Advance Package to OE│
└─────────────────────────┘
          │
          ▼
┌─────────────────────┐
│      Step 3         │
│  OE Recruiting Call │
└─────────────────────┘
          │
          ▼
       ╱────────╲
      ╱  Is OE   ╲   No    ┌──────────┐
     ╱  Eligible? ╲──────▶│   Stop   │
      ╲          ╱         └──────────┘
       ╲────────╱
          │ Yes
          ▼
       ╱────────╲
      ╱  Is OE   ╲   No          Conversion effort
     ╱  Willing?  ╲──────┐
      ╲          ╱       │
       ╲────────╱        ▼
          │ Yes      ╱────────╲
          │         ╱Successful?╲  No    ┌──────────┐
          │          ╲         ╱──────▶ │   Stop   │
          │           ╲───────╱          └──────────┘
          │              │ Yes
          ▼              │
┌─────────────────────────────┐
│          Step 4             │
│ Mail Questionnaire Package to AM│
└─────────────────────────────┘
          │
          ▼
┌─────────────────────────┐
│         Step 5          │
│ 7-Day Follow-Up Call to AMI│
└─────────────────────────┘
          │
          ▼
┌─────────────────────┐
│      Step 6         │
│ Mail Postcard to OE │
└─────────────────────┘
          │
          ▼
┌──────────────────────────┐
│         Step 7           │
│ 21-Day Follow-up Call to OE│
└──────────────────────────┘
          │
          ▼
┌──────────────────────────┐
│         Step 8           │
│ 31-Day Follow-up Call to OE│
└──────────────────────────┘
          │
          ▼
┌──────────────────────────────┐
│          Step 9              │
│ Replacement Questionnaire(s) │
│       Mailed to OE           │
└──────────────────────────────┘
          │
          ▼
┌──────────────────────────┐
│         Step 10          │
│ 45-Day Follow-up Call to OE│
└──────────────────────────┘
```

*O*NET Data Collection Program*

B.3   Methods to Maximize Response Rates

The O*NET Data Collection Program is committed to achieving the highest possible response rates through continuous improvement. Accordingly, the data collection procedures are continually evaluated in light of the experience gained in the data collection process. The previous OMB Supporting Statement dated July 11, 2002, listed a number of enhancements that had been made prior to that submission. The principal enhancements introduced since that time to maximize response rates are summarized below. (See *Section B.2* for a full description of the data collection procedures.)

- An industry-specific consultant was retained to assist with developing specialized procedures, materials, and Business Liaison training.

- The number of Team Leaders was increased in order to lower the ratio of Team Leaders to Business Liaisons and increase the amount of time devoted to Business Liaison coaching and development, case review, and refusal conversions.

- The monitoring system used to monitor the Business Liaisons' telephone interactions with POCs was enhanced through the introduction of an electronic monitoring form that facilitates real-time recording of monitoring results and provides more objective grading criteria and automated scoring.

- Customized lead letters from the Department of Labor and endorsement letters from appropriate professional associations are used for certain occupations (such as educational institutions and medical specialties) to address particular concerns that employees in the occupation are likely to have and to add credibility to the study and to underscore its importance. The CMS was modified to accommodate these customized mailings.

- The CMS and the protocol were modified to support the ability to designate more than one POC in an establishment. Due to the divergent nature of some departments within large establishments, this enhancement helps gain cooperation at the establishment level by spreading the burden across more than one POC. It also facilitates the development of more accurate employee rosters and more timely distribution of employee questionnaires by the division-specific POC(s).

- Quarterly debriefings have been instituted in which the contractor's project management staff members meet with the Team Leaders and management staff of the Operations Center to discuss issues related to data collection operations. Ways to enhance response rates are a standard agenda item at these meetings.

- An additional screen was added to the CMS to capture POC-provided data as to why high-stratum O*NET-SOC occupations were not present at an establishment. High-stratum O*NET-SOC occupations are those that are expected to have a high likelihood of being found at a selected establishment. If the POC says that none of these O*NET-SOC occupations are present at the establishment, the Business Liaison is prompted to ask why they are missing (e.g., downsizing, outsourcing). This information is used by the contractor's sampling staff to refine the sample selection process for these O*NET-SOC occupations.

- In an effort to improve the "hit rate" for certain hard-to-find O*NET-SOC occupations, the Operations Center staff assist the contractor's sampling staff by conducting telephone operations to help identify the types of establishments that contain the occupation and to help build special sampling frames for the occupation.

- The training program for new Business Liaisons was enhanced to include an expanded module for answering POC questions and overcoming objections.

- The questionnaires and informational materials were translated into Spanish and used for occupations with a high percentage of Hispanic workers.

These and other enhancements appear to have had a very positive impact on our ability to secure the participation of establishments. For example, the establishment response rate for data collection waves completed in 2004 was 79%, compared with 70% for all waves completed as of September 2004 and compared with 64% for our initial data collection wave completed in 2001–2002. We will continue to explore ways to enhance response rates still further through our ongoing continuous improvement program.

B.4   Tests of Procedures

The POC Incentive Experiment was initiated in June 2003 and continued through 2004. *Appendix G* contains a report (RTI International, 2005) that describes the experiment and the findings. The experiment is summarized below.

The purpose of the experiment was to examine the effects of offering POCs who agreed to participate a prepaid $20 incentive, in addition to other material incentives described in *Section B.2*. The survey methods literature (see, for example, *Section A.9*) suggests that the additional incentive has the potential to significantly and positively affect both the establishment and employee response rates.

However, results of the experiment provided no evidence that the incentive improved cooperation rates at the establishment level or the employee level. The POC appears just as likely to initially agree to participate in the O*NET data collection with the $20 incentive as without it. This may be explained by the fact that the POC was initially presented with a fairly extensive array of motivating materials and gifts in the early stages of the recruitment process. It is conceivable that the $20 incentive seemed to be a small incremental benefit to the POC compared with all the other benefits that are part of the POCs participation in the survey. Further, since most POCs conduct their O*NET work with the approval of their supervisors and, presumably, on company time, any additional monetary gift may have been viewed as unnecessary by the POCs and their employers.

Another hypothesis was that, by accepting the incentive, the POC would be more motivated to follow up with employees who have not responded and would become even more committed to "doing their part" for the O*NET program. However, the evidence of a benefit for employee response rates was quite weak. There was evidence that some occupations in rural areas may have benefited from the incentive. In the analysis of the experiment, groups showing a trend toward a positive incentive effect were relatively small compared to those groups showing no effect.

In addition, an inexplicable and pronounced negative effect was found in large rural establishments, which represent about 6% of all employees. However, through focus groups with the O*NET Operations Center staff, there was no evidence that any Business Liaison had ever encountered a hostile or negative reaction from the POC concerning the incentive. Therefore, the negative effect observed for large rural establishments was inexplicable and was regarded as spurious.

Taken as a whole, the employee analysis results suggested weak evidence at best of any possible effect of the monetary incentive on employee response rates. This, combined with the lack of evidence of any cost advantage using the incentive, led to the conclusion that the $20 incentive offered no important benefits to the O*NET data collection, and the experiment was terminated in December 2004.

B.5   Statistical Consultants

The statistical consultants listed in *Exhibit B-6* reviewed this OMB Supporting Statement.

Exhibit B-6.   Statistical Consultants

Name	Organization	Telephone Number
(1) Non-Federal Statisticians and Researchers		
John Campbell	University of Minnesota	612-625-9351
Michael Campion	Purdue University	765-494-5909
(2) Federal Government		
Shail Butani	Bureau of Labor Statistics	202-691-6347
Alan Dorfman	Bureau of Labor Statistics	202-691-7278
Michael Pilot	Bureau of Labor Statistics	202-691-5700
George Stamas	Bureau of Labor Statistics	202-691-6350
(3) Data Collection/Analysis Contractors		
Paul Biemer	RTI International	919-541-6056
Laurie Cluff	RTI International	919-541-6514
Kathryn Dowd	RTI International	919-541-6262
Chris Ellis	RTI International	919-541-1261
Michael Weeks	RTI International	919-541-6026
Rick Williams	RTI International	919-541-6075

The DOL/ETA official responsible for the O*NET Data Collection Program is Pam Frugoli (202-693-3643).

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