



Call Order 0001: Job Analysis Methodology

Final Report on the Review and Evaluation of Job Analysis Practices

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Biographical Summaries

Brian Cronin, Ph.D., a Senior Manager with ICF International, has a Ph.D. in industrial/ organizational psychology and served as the as the Call 0001 Project Manager. He has over 10 years of experience in leading workforce development, occupational survey and job analysis studies. Dr. Cronin has conducted a variety of projects related to these areas of expertise for public sector agencies, including the Social Security Administration, Texas Workforce Commission, Transportation Research Board, Federal Highway Administration, the Texas Governor’s Office, and the Federal Aviation Administration. He has also forecasted staff/skill estimates and conducted workforce development projects for the several branches of the U.S. Military and the states of Virginia, Missouri, Pennsylvania and Florida. For each of these studies, Dr. Cronin has provided comprehensive labor force solutions. Dr. Cronin also routinely publishes and presents research for national audiences on related topics such as improving staffing procedures, the use of technology in human resource initiatives, and large-scale employee assessment efforts.

Beth Heinen, Ph.D., a Senior Associate with ICF, served as a task lead for the literature reviews for both Call Order 001 and Call Order 002, and was integral in developing the user-friendly final job analysis report for Call Order 001. Dr. Heinen has more than eight years of organizational research and management consulting experience. She has worked with clients such as the Social Security Administration, Texas Child Protective Services, the U.S. House of Representatives, and the Army Research Institute. Dr. Heinen’s primary work activities include addressing workforce issues, such as recruitment, retention, training and development, and work-family issues. Dr. Heinen has extensive experience conducting job analyses, interviews and focus groups, developing and administering surveys and tests, assessing and evaluating programs, and analyzing data. Dr. Heinen has presented research at national conferences and published articles in scholarly journals and book chapters on these and other topics. For SSA, Dr. Heinen served as a task lead for the literature reviews for both Call 01 and Call 02 and was integral in developing the user-friendly final job analysis report. Dr. Heinen has a Ph.D. in Industrial/Organizational Psychology from George Mason University.

Jessica Jenkins, M.Phil., a Senior Associate with ICF, had a significant role in conducting research, facilitating focus groups, and preparing reports for Call Orders 001 and 002. Ms. Jenkins has five years of job analysis experience. She has conducted job analyses spanning a variety of occupations and industries in both the public and private sectors and has contributed to several projects relating to occupational analysis and disability, including prior work with the Social Security Administration and the Department of Labor’s Office of Disability Employment Policy (ODEP). Ms. Jenkins has a Master’s degree in Industrial/Organizational Psychology from the George Washington University.

Lance Anderson, Ph.D., a Vice President at ICF, serves as the Project Director for the BPA with SSA. Dr. Anderson has over 20 years of experience in occupational analysis. He has directed projects dealing with job and occupational analysis, recruitment, selection, training, certification, and disabilities. Some of these projects have been multi-million dollar efforts, including a \$5,000,000 project with the State of Alabama to conduct job analysis and test development for 50 jobs. Dr. Anderson has conducted or supervised over 100 job analyses, has played a key role in evaluating occupational information for SSA, and has developed methods for using occupational information to determine disability. Dr. Anderson also played an important role in the development of the O*NET occupational information system. Dr. Anderson is currently directing a project to identify factors that affect the return to work of veterans with severe injuries. He is a parent of an adult with an intellectual disability, and an active member of the disability community. He holds a Ph.D. in Industrial and Organizational Psychology from Bowling Green State University.

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Allison Cook, M. S., an Associate with ICF, conducted research and wrote large sections of the reports for both Call Order 001 and 002. She has experience in conducting research in the areas of job analysis, training and certification, developing performance measures, employee attraction and retention, workforce development, employee work/life issues, and employee assessment. She has recently been involved in research projects for a variety of clients such as the Transportation Research Board, the Federal Highway Administration, U.S. Department of Veterans Affairs, and both Call Orders 001 and 002 for the Social Security Administration. Ms. Cook has conducted numerous literature reviews to aid in background research and product development and has experience developing and administering surveys as well as facilitating interview and focus groups to collect data. Ms. Cook has strong research and data analysis skills, with experience in various types of qualitative and quantitative data analysis. She consistently presents research at national conferences on diverse topics such as employee performance and performance constraints, employee work-life issues, and employee attitudes and was awarded a best poster award for one of these research presentations. Ms. Cook has a Master's Degree in Industrial/Organizational Psychology and is currently completing her Ph.D. in the same field at Texas A&M University.

Leonard Matheson, Ph.D., served as technical advisor on Call Order 001. He is a psychologist who is a pioneer in the field of occupational rehabilitation. He is the originator of work hardening and has participated in setting national standards of practice for work hardening, work conditioning, work capacity evaluation, and functional capacity evaluation. He has designed many of the tests and treatment models that are in use in Occupational Rehabilitation today. His tests have been translated into more than two dozen languages. Among more than 45 peer-reviewed scientific papers and 100 invited papers and chapters in textbooks are the chapters on functional capacity evaluation in the American Medical Association's Disability Evaluation handbook. He is a consultant to several Fortune 100 employers and insurance carriers, the Social Security Administration, the United States Congress, the American Medical Association, and hundreds of rehabilitation centers and governmental agencies in the United States, Canada, and other countries. He has testified before the United States House of Representatives in

Washington, DC. He also served on the editorial board of *Spine* for ten years and currently serves as an associate editor of the *Journal of Occupational Rehabilitation* and is on the editorial board of *Work*.

Paul Davis, Ph.D., served as technical advisor on Call Order 001. He is founder of First Responder Institute, a 501(c)(3), philanthropic organization dedicated to supporting the public safety sector through research and education programs designed to improve health, fitness, readiness and survivability. He earned his doctoral degree from the University of Maryland, School of Public Health, Department of Kinesiology where he placed major emphasis on the study of occupational fitness requirements and the quantification of work physiology. His dissertation on the energy costs and oxygen/lactate kinetics of structural firefighting was the first published study of its kind. An internationally recognized authority on the subject of fitness standards and equal employment opportunity issues, Dr. Davis has participated in over 60 legal proceedings as an expert witness. In the seminal *Lanning v SEPTA* case, he won the accolades of the presiding federal judge as “the preeminent expert on physical performance standards.” He has appeared on behalf of such organizations as the U.S. Department of Justice, OSHA, Equal Employment Opportunity Commission, and the FBI, as well as many other state and local governments. He has also testified before the House Select Committee on Aging regarding performance-based health and fitness assessment.

Kelly Chapman-Day, Ph.D., served as technical advisor on Call Order 001. She has 8 years of research and consulting experience in job analysis, Functional Capacity Evaluations, the implementation of work hardening and work conditioning programs, ergonomic analysis, the rehabilitation of injured workers and validation of post-offer employment testing. Dr. Chapman-Day has performed Physical Demands Analyses for employers throughout the United States including several Fortune 500 companies including Sara Lee, Tropicana, Steelcase, Frito Lay & Gatorade. In addition, Dr. Chapman-Day has performed job analysis for Natural Gas and Electric (production and distribution) companies, automobile assembly plants, fire protection and police districts and distribution facilities. The job analysis work covers diverse occupations such as electricians, mechanics, pipefitters, welders, over-the-road truck drivers, jockeys, train engineers, train conductors, fork lift truck drivers, operators, clerical workers and assistants, police officers, fire fighters, nurses, patient care technicians, paramedics, and emergency medical technicians. Dr. Chapman-Day's training and experience includes working with people with various types of physical and mental disabilities, in both physical and industrial rehabilitation settings. Dr. Chapman-Day is also a Certified Vocational Evaluator and is qualified to administer physical and psychological assessments and she has experience performing ergonomic evaluations and implementing ergonomic programs. Dr. Chapman-Day and has trained extensively in data collection methods and analysis. Dr. Chapman-Day completed her training in conjunction with Dr. Leonard Matheson, PhD, CVE, CRC who is one of the most respected scholars in the country in the area of industrial rehabilitation. Dr. Chapman-Day holds a clinical doctorate degree in Occupational Therapy from Washington University School of Medicine in St. Louis, Missouri.

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Executive Summary

E.1 Introduction

The Social Security Administration (SSA) is undertaking a project to develop a new Occupational Information System (OIS) tailored specifically for SSA's disability programs and adjudication process. The Occupational Information System (OIS) project will provide SSA with a long-term replacement for the information that the agency currently uses in its disability evaluation process and obtains from the Dictionary of Occupational Titles (DOT) and companion volumes, including the Selected Characteristics of Occupations (SCO) and the Revised Handbook for Analyzing Jobs (RHAI). As part of this project, SSA awarded ICF International with a Blank Purchase Agreement (BPA) in September 2010. The BPA includes separate Call Orders with an overarching purpose to assist SSA in the development of the business processes and standards required to recruit, train, and certify job analysts. This work will ensure potential job analyst candidates will be able to collect the detailed occupational information that will populate an SSA-specific OIS.

In this Executive Summary, a brief description of the Call Order 0001 purpose and project methodology is provided along with a summary of Call 0001 data collection results, including the systematic evaluation of each of the major job analysis practices reviewed. We conclude the Executive Summary by highlighting specific recommendations that will assist SSA in determining how to operationalize an effective strategy for developing an SSA-specific job analysis methodology. For clarification of the meaning of terminologies in this summary, we use following nomenclature:

- **Project Method(ology)** – The steps taken to conduct this research for this call order
- **Job Analysis Method(ology)** – Refers to ultimate SSA job data collection process developed to address OIS needs
- **Practice** – Refers to all job analysis approaches, models and procedures, identified through this call order
- **Model** – Refers to an established, 'off-the-shelf' job analysis approach identified through this call order
- **Procedure** – Refers to a data collection technique identified through this call order

E.2 Purpose of Call Order 0001

To develop its OIS, SSA needs a detailed methodology and strategy that would permit analysts to perform job analysis on jobs that exist throughout the labor market of the United States. The purpose of Call 0001 was to perform the research needed to develop and support this methodology. The Call 0001 approach included consultation with job analysis experts in related fields through focus groups, a detailed review of relevant literature (e.g., reports, white papers, technical and scientific journals), and the development of a specific framework and criteria for evaluating various job analysis approaches and identifying those most suitable for addressing SSA's OIS objectives. Call Order 0002 that focused on identifying existing job analysis training features was being conducted simultaneous to Call Order 0001 and thus some data collection overlapped across the calls.

Specifically, Call Order 0001 results provide a review and evaluation of the spectrum of job and work analysis practices available across related fields. Historically, job analysis is performed in a number of disciplines by individuals with various background and expertise including vocational rehabilitation counselors, physical and occupational therapists, human resource professionals, ergonomists, occupational health nurses, occupational health physicians, safety professionals, industrial psychologists,

disability managers, job placement specialists, neuropsychologists, exercise physiologists, athletic trainers, case managers, risk managers, return-to-work specialists, and claims, or insurance, adjusters. Each type of professional approaches job analysis in a somewhat different manner—for example, physical and occupational therapists tend to focus on the physical, psychomotor, and environmental demands of work. In contrast, human resource professionals tend to approach job analysis with more emphasis on the cognitive and affective requirements for work, while safety professionals focus on the environmental aspects.

Based on our assessment of all available job analysis practices, this executive summary and the final report include analysis and recommendations that will provide SSA with the crucial direction needed to identify the appropriate methodology(ies) that will satisfy SSA's needs in developing the new occupational information. In the next section, a brief overview of the Call 0001 project is provided.

E.3 Project Methodology

Call Order 0001 consisted of two main tasks: 1) Task Meetings/Discussions and 2) Review and Evaluation of Job Analysis Practices. A summary of related activities is provided below.

Task 1 – Task Meetings/Discussions

Given the impact of decisions made as a result of the Call Order 0001 and larger OIS project, SSA and ICF have been committed to partnership and frequent communication through regular summary progress reports, telephone conference calls, and meetings. This dialogue started at the Project Kick-Off Meeting on October 20, 2010. SSA project stakeholders and key ICF personnel met at the SSA Headquarters building in Baltimore, Maryland to discuss of the scope of work and review the proposed approach and timetable to complete the services requested.

Following the Kick-Off Meeting, SSA and ICF had regular and candid discussions regarding SSA's vision of the Call 0001 deliverables, ICF's project plan, the research timeline, and final results. These discussions typically occurred in weekly or bi-weekly meetings. The consistent and open communications were extremely beneficial and facilitated ICF's progress on Call Order 0001. In addition to regular meetings, the ICF team provided SSA with meeting minutes and monthly project updates.

Task 2 – Review and Evaluation of Job Analysis Practices

The purpose of this task was to conduct a detailed research effort that would suggest efficient and practical job analysis practices to inform development of an SSA-specific methodology to perform job analysis in various geographical locations throughout the United States. A detailed description of all planning, development, and project methodology can be found in Chapter 2 of the Final Report. In this section, we briefly describe our major project data collection activities.

- Conduct Focus Groups with Job Analysis Professionals
- Conduct Detailed Literature Review

Each of these activities is discussed below.

Conduct Focus Groups with Job Analysis Professionals. Focus groups were conducted over the phone with job analysis experts from a variety of disciplines in order to discuss features of a sound job analysis methodology. We also collected data for Call Order 0002 with these professionals in order to identify minimum qualifications needed to perform job analysis and uncover recommended strategies and approaches for job analyst training. The focus group technique was chosen for this activity because focus

groups provide an opportunity for group discussion and can be an incentive for professionals to participate as it gives them a chance to share with and learn from others.

Given the diverse nature of job analysis practices, it was important to gather perspectives of experts from a broad range of fields that perform job analysis. Based upon a preliminary review of job analysis literature as well as the job analysis expertise of ICF, its expert subconsultants, and SSA, ICF developed a list of disciplines that frequently perform job analysis. These fields included the following:

- *Vocational Rehabilitation*—uses job analysis for purposes including prevention of disability, rehabilitation planning, and disability accommodation (Lysaght & Shaw, 2011)
- *Physical and Occupational Therapy*—uses job analysis for purposes including evaluating injured workers, planning rehabilitation, developing transitional work plans, and conducting environmental modification and risk management programs (Lysaght, 1997)
- *Human Resources*—uses job analysis for purposes including employee selection, training, appraisal, and establishing compensation rates (Brannick, Levine, & Morgeson, 2007)
- *Industrial/Organizational Psychology*—uses job analysis for purposes including employee selection, training, appraisal, and establishing compensation rates (Brannick, Levine, & Morgeson, 2007)
- *Ergonomics*—uses job analysis to identify specific stressors and risks in the job (Keyserling, Armstrong, & Punnett, 1991)
- *Occupational Health*—uses job analysis to identify safety concerns and job hazards and to identify potential preventive measures (Canadian Centre for Occupational Health and Safety, 2008)

Although practitioners in each of these fields may have very different perspectives on the purpose and practice of job analysis, ICF's efforts to gather feedback from all of them enabled us to present a comprehensive review of effective practices in job analysis and training methods that would serve SSA's purposes.

Following the focus groups, our team analyzed participant responses to identify the key findings that were discussed. Important points made in the focus group that addressed the respective protocol question were recorded following the dialogue for that given question.

Conduct a Detailed Literature Review. A search of the literature was also conducted to identify a broad set of job analysis practices that could potentially be included in the SSA job analysis method. We searched for and obtained information on practices that address the issues most applicable to SSA's needs. The following four activities were included in the literature review:

- Create literature review database
- Develop search strategy
- Screen job analysis sources
- Train data entry team and enter articles.

Create Literature Review Database. We began this activity by developing 1) a framework for describing job analysis practices and 2) criteria for evaluating job analysis sources (i.e., screening criteria). This framework was used to help describe and categorize the various features of job analysis practices across methods and disciplines. Our job analysis experts drafted the literature review framework based on their knowledge of job analysis practices as well as a preliminary review of related literature. The draft

framework was then sent to SSA for feedback and additional refinements. The final framework can be found in Appendix A.

The final job analysis practices framework was used as the underlying structure of our Microsoft (MS) Access Literature Review database. The database was used as a tool to document the information found across all job analysis literature sources. A MS Access data-entry form (see Appendix B) was created that contained check boxes and text boxes associated with all framework categories to aid the ICF literature review team in entering all job analysis information into the database in a user-friendly way.

Develop Search Strategy. We identified the literature review search strategy by determining appropriate sources for job analysis literature from various disciplines. A source was determined as appropriate based on quality, timeliness, and extent of detail provided. It was important that the sources reviewed such as articles, technical reports, and websites discussed a job analysis model, procedure, or practice with enough information to allow us to draw conclusions about the practice. Sources that, for example, discussed the benefits of job analysis in general were not considered appropriate for the literature review database.

Because our team includes professionals from diverse fields, including vocational rehabilitation, exercise physiology, occupational therapy, and industrial/organizational psychology, we first solicited a list of the best job analysis sources from each of our team members. We then performed searches to locate book chapters, peer-reviewed journal articles, and other materials using research-based search engines (e.g. EBSCO), online bibliographic resources, governmental resources, World Wide Web searches, and direct communications with the research and rehabilitation communities. Within each of these search mediums, we performed searches on general job analysis, specific data collection procedures (e.g., job observation), established job analysis models (e.g., Position Analysis Questionnaire), and job analysis in various disciplines. Additionally, sources indicated as relevant taxonomies in the *OIDAP Content Model and Classification Recommendations* report were located and included in the literature review. The full text of all sources identified was gathered in electronic format or in hard copy when the electronic copies were not available.

Screen Job Analysis Sources. To maximize the quality and usefulness of each source entered into the literature review MS Access database, each literature source was reviewed by an ICF team member and evaluated for appropriateness to the current effort. If a literature source was evaluated as appropriate, it was entered into the database. Initially literature sources that were rejected were not entered into the database at all; however, at the request of SSA for a complete capture of all the literature reviewed, the rejected literature sources, but not their content, were entered into the database.

Train Data Entry Team and Enter Articles. Once the final set of ‘retained’ job analysis articles was identified, the literature review team was trained on the framework for describing job analysis practices and the functionality of the Literature Review database. To establish inter-rater reliability and consistency, each team member independently reviewed and fully entered two job analysis sources into his/her own practice database after the initial literature review training session. The sources used as training entries were selected to provide a variety of discipline, article type, and level of detail provided. All entries were compared and discrepancies between entries on the same article were used as the basis for further discussion and refinement of the framework definitions. This process allowed each literature review team member to adequately understand each framework category and option and agree on the information that should be entered in order to maximize consistency in source entries across team members.

After each team member was sufficiently trained on the framework and MS Access database and the training articles were completed, the final set of sources for full entry were split up and assigned to team

members. Each team member fully entered each source according to the framework categories and options outlined in Appendices A and C.

E4. Job Analysis Practice Review Results, Recommendations, and Summary

The results of this call order describe a wealth of job analytic procedure information available across disciplines in a manner that will allow SSA decision makers to quickly understand and evaluate various job analysis practices. To achieve this objective, the ICF team analyzed results from all Call 0001 data collections (i.e., literature review and focus groups). In this section, we provide an overview of our findings and recommendations related to the job analysis data collection procedures assessed in this call order, as well as existing job analysis models reviewed. Project findings suggest there are features of the practices reviewed that could be integrated into a job analysis methodology that is developed specifically for SSA. The final methodology must systematically combine an appropriate set of individual job analysis practices, potentially including: a subset of data collection procedures, an adaptation of features of an existing job analysis model(s), and/or new data collection procedures specifically designed for the purposes of addressing the requirements of the final content model and populating the OIS. (*Note: Many other procedures and models were reviewed and evaluated as part of Call 0001 for SSA's purposes. Related results are provided in Chapters 10 and 21 of the full report, which are referred to as 'supplemental' chapters.*)

Study Recommendations

Recommendations are provided in this section that SSA should consider when developing their final job analysis methodology. The recommendations are based on our focus group and literature review data collection results, analysis of existing job analysis practices, input from our expert panel, and our understanding of SSA's project objectives.

Once important aspects related to the job analysis methodology, such as the content of the job analysis instrument, have been finalized, recommendations specific to SSA's purposes can be made based on all of the information provided in the Final Report. However, given the detailed research gathered, input from job analysis experts, and our understanding of SSA's project objectives, we provide some general recommendations here about the greater job analysis methodology as well as some more specific recommendations of practices that should be considered once the content model and taxonomy are developed. Thus when developing the final methodology, SSA should consider the detailed information and recommendations provided in conjunction with other job analysis practice information gathered in OIS project activities (e.g., content of job analysis instrument, education and experience of job analysts, etc.) to identify the best set of practices to employ.

Recommendations Related to Major Procedures Reviewed. In Exhibit ES-1 we provide our recommendations related to each of the six major data collection procedures reviewed in this call order. For each procedure, we provide a brief description of the procedure, potential usage for SSA, and potential challenges with respect to SSA's needs. In Chapter 22, additional information related to each procedure is presented including: *Example Sources of Data, Example Types of Data Collected, and Example Models that Incorporate the Procedure*. This detail is provided to assist SSA in understanding the procedures reviewed and to provide insights to SSA in developing its final methodology.

Exhibit ES-1 Summary of Recommendations on Data Collection Procedures	
Data Collection Procedure	
Review of Written Materials (see Chapter 4)	<p>Review of Written Materials (RWM) RWM is the process of analyzing job-related documents and reports to gain a broader and more detailed understanding of the job. When conducting RWM, it is prudent for job analysts to take structured notes related to the tasks, knowledges, skills, abilities, cognitive requirements, and physical demands associated with the job as well as other occupational requirements. It is also critical to catalogue all materials reviewed for future reference. Through this process, analysts are able to become more familiar with the target job. Knowledge gained through RWM can even be used to inform subsequent data collection techniques; to refine the questions asked in interviews, focus groups, and surveys; and/or to begin the process of completing structured work analysis instruments.</p> <p>Potential Usage for SSA: RWM could serve as an effective, cost-efficient starting point for collecting data about a job and be used to identify the types of additional questions that should be asked in subsequent data collection activities. SSA should incorporate this procedure into the final method chosen.</p> <p>Potential Challenges: RWM should only be used in conjunction with other data collection procedures since RWM is dependent on the availability of source documents, which can vary in usefulness.</p>
Job Observation (See Chapter 5)	<p>Observations can be used to collect accurate information about job tasks and equipment/materials used on the job as well as the work environment in which a job occurs. While observing a job, the analyst should interact with the incumbent or ask questions to clarify what the incumbent is doing. However, if interactions will distract the incumbent or create a dangerous situation, the analyst should not interact with the incumbent. In either case, observations should be thoroughly documented in order to maintain a record of what was done and to defend in case of legal challenges</p> <p>Job observation typically results in highly-detailed and customized information that is specific to the job being examined, which helps to provide a full picture of the job in question. In addition, job observations may not be appropriate for all jobs, such as those that are primarily cognitive in nature or that involve many infrequently performed tasks. Thus, it is recommended that job observations are used as in combination with other data collection procedures. Further, depending on the final instrument, job observations are likely not necessary for the analysis of every job.</p> <p>Potential Usage for SSA: Job observations should be incorporated in SSA's final method. They provide detailed information about the job because they do not rely solely on the testimony of incumbents.</p> <p>Potential Challenges: Job observations are often times costly and time consuming to conduct. They require the analyst be well trained in the types of information that he/she should be looking for. They are less valuable for highly cognitive jobs in which a number of the work activities are not directly observable.</p>

Exhibit ES 1 (Continued) Summary of Recommendations on Data Collection Procedures	
Data Collection Procedure	
Survey (See Chapter 6)	<p>Surveys are often used to estimate how prevalent a practice or belief is across a population of individuals. When used in job analysis, surveys can help identify whether a practice identified by an incumbent is common to the job (as supported by a representative group of incumbents) or is unique to the individual who provided the information. Surveys provide quantitative evidence for the frequency or importance of specific tasks or the linkages of knowledges, skills and abilities to those tasks.</p> <p>If SSA incorporates a survey in the job analysis methodology, other data collection procedures (e.g., job observation or interview) should be used to supplement or validate the data collected. Finally, alternate methods to collect the information requested in the survey should be devised in the event incumbents are unable to complete the survey due to time constraints or reading levels.</p> <p>Potential Usage for SSA:</p> <p>Surveys can be an effective and efficient means of collecting a large amount of data from a large number of job experts (who may be geographically dispersed) across a wide spectrum of jobs. Additionally, the uniformity and standardization of a survey allows for similar interpretations and comparisons of job data obtained from a variety of jobs and locations. Given the utility of surveys, this data collection procedure should be further considered for inclusion in SSA's ultimate methodology.</p> <p>Potential Challenges:</p> <p>Two disadvantages of surveys in the SSA context: there are various threats to the validity of the information, and data collection costs could be high. Threats to validity include: incumbents ratings tend to be inflated, incumbents do not have the benefit of understanding their job requirements relative to those of other jobs, incumbents may not fully understand the elements to be rated, and, in this context, respondents will have no particular reason to put effort into completing the survey. Data collection costs will also be high in this context given that SSA will not be able to rely on employer support or universal access to the Internet to complete the survey on-line.</p>

Exhibit ES 1 (Continued) Summary of Recommendations on Data Collection Procedures	
Data Collection Procedure	
<p>Structured Interview (See Chapter 7)</p>	<p>Structured interviews allow analysts to collect detailed job information through the direct questioning of incumbents. Both telephonic and face-to-face interviews produce valuable job data; however, conducting the structured interview in person may have an added benefit for the analyst. Face-to-face interviews sometimes permit the analyst to tour the workplace, letting the analyst visually notice job information that may not have surfaced during a phone or desk interview. A face-to-face interview can often be combined with a job observation to collect thorough and valid data.</p> <p>There are several techniques that should be incorporated to ensure reliable and valid job data are collected through the interview process. First, the interview should include a structured protocol as well as structured note pages to collect and organize participant input. Next, after the interview is complete, the analyst should immediately spend time organizing his/her notes to clarify key job information. In addition, it is often helpful for the analyst to record the interview with the participant's consent. The recording can be referenced to clarify notes taken in the live interview and serve as documentation. Finally, the analyst should conduct multiple interviews. Interviewing different incumbents and supervisors allows the analyst to cross-check data and identify any inconsistencies among interview responses, which can then be clarified.</p> <p>Potential Usage for SSA:</p> <p>Structured interviews allow analysts to collect detailed job information and ask clarification questions especially to clarify complex tasks or functions that comprise the job. By being structured, the data from this type of interview can easily be compared to data collected through other interviews. This procedure should be incorporated into SSA's ultimate data collection methodology.</p> <p>Potential Challenges:</p> <p>Interviews can be very time-consuming and costly to conduct, especially if travel is required. A large portion of the time involved in interviewing is the development of the structured protocol and coordinating schedules with the interview participant.</p>

Exhibit ES 1 (Continued) Summary of Recommendations on Data Collection Procedures	
Data Collection Procedure	
Focus Groups (See Chapter 8)	<p>Similar to interviews, a focus group allows job analysts to collect a variety of data, from simple to highly-complex in detail, by asking several job experts questions about the job and what type of individual it might take to perform the work tasks and functions. Focus groups differ from interviews in that focus groups are best used for eliciting information that is most likely to emerge through the interaction of participants.</p> <p>If focus groups are implemented, there are several guidelines that should be followed. First, specialized training should be provided to job analysts since focus groups required a skilled facilitator. With multiple participants present, the group can easily get off topic if not facilitated properly and confidently. Likewise, the participants should be provided with an agenda prior to the meeting and the analyst should offer participants a concise background of the project, inform them of the goals of the meeting, and guarantee them anonymity upon request. These procedures help establish a strong rapport with participants and create a level of trust, which is necessary for collecting honest and accurate data.</p> <p>Potential Usage for SSA:</p> <p>Focus groups can be time- and cost-efficient because they can be used to gather data from multiple sources/incumbents concurrently. When richer data is needed such as when initial work activities and/or task lists are being described, focus groups help incumbents generate ideas through the interaction with others in their cohort. We recommend that interviews be used instead of focus groups whenever possible because focus groups are best reserved for initial stages of data collection if time permits idea generation/brain storming whereas interviews typically allow for more extensive questioning and crystallization of information collected.</p> <p>Potential Challenges:</p> <p>It is difficult to ask specific questions or gather precise information when multiple participants are present. It is often challenging to gather detailed information from every individual in a focus group. Group dynamics can skew participant responses. Focus groups can be dominated by more vocal participants, not necessarily more knowledgeable participants. It is easier to get off track in focus group discussions as opposed to other data collection techniques. Focus groups can be difficult to convene since they require coordinating the schedules of multiple individuals.</p>

Exhibit ES 1 (Continued) Summary of Recommendations on Data Collection Procedures	
Data Collection Procedure	
Physical Demands Measures (See Chapter 9)	<p>These measures refer to job analysis data collection procedures that involve taking measurements from job incumbents in an effort to assess the physical demands of the job. While physical demands are often inferred through other data collection procedures (e.g., observing or interviewing incumbents and then making ratings), these procedure are defined by the use of measuring devices to take more objective, quantitative measurements. For example, this may involve measuring the amount of force workers must exert, the amount of weight they must lift, the dimensions of their posture, the range of motion they must use, the amount of vibration to which they are subjected, or the amount of repetition required by their work. Photo or video cameras may even be used to capture the motion for subsequent measurement.</p> <p>Potential Usage for SSA:</p> <p>The instrument measurement of physical demands results in a number of advantages, including the precise nature of the collected data, high reliability, high validity, and data that are typically easy to aggregate. Depending on SSA's ultimate construct model and data collection instrument, we recommend the inclusion of instrument measurement of physical demands. Given the types of decisions made via SSA's OIS (i.e., disability determinations), it may be imperative to collect physical demands data for jobs that include tasks that are not highly cognitive in nature. In those cases, specific physical demands measures should be used to some extent.</p> <p>Potential Challenges:</p> <p>Such detailed measurement procedures can be time consuming and resource intensive, can be intrusive to incumbents, and often involves the use of complex measuring devices that require technical training. Thus, if instrument measurement of physical demands is incorporated into the final methodology, we recommend that its use is limited.</p>

Recommendations Related to Major Models Reviewed. In Exhibit ES-2 we provide our recommendations related to each of the ten major job analysis models reviewed in this call order. Many of the established job analysis models include a combination of the procedures previously reviewed. For each model, we provided an overview of the model, the effective features that may be relevant to SSA, and the limitations of the model given SSA's needs. In Chapter 22, additional information related to each model is presented including: *Tools used to Collect Data, Target Procedures, Example Types of Data Collected, and Example Scaling.* This detail is provided to assist SSA in understanding the models reviewed and to provide insights to SSA in developing its final methodology.

Exhibit ES-2 Summary of Recommendations on Job Analysis Models	
Job Analysis Model	
AET (See Chapter 11)	<p>The AET involves conducting an observation and interview to complete an ergonomic questionnaire. Although the AET collects a large number of specific data points that are not necessarily in line with the needs of SSA, the combined observation and interview technique coupled with a completion of a standardized tool provides an example of a resource efficient way to collect detailed data about the work context and physical demands of the job. The AET is effective at measuring the physical and psychological stresses of work tasks, as well as environmental conditions and work context. If SSA were to adopt a strategy involving observation and interview followed by analyst ratings, there are several aspects of the AET that SSA might want to incorporate into the OIS.</p> <p>Effective features that SSA might want to consider:</p> <ul style="list-style-type: none"> - The use of structured observation and interviews together with completion of a standardized tool by the analyst - The use of descriptors that isolate specific types of physical effort (e.g., finger, hand, and forearm muscular effort without support of body weight). - The use of descriptors that measure work context - The use of scales that focus on frequency, duration, and significance - The use of examples to assist in coding level of demand <p>Limitations for the SSA context:</p> <ul style="list-style-type: none"> - The AET was developed in Germany, in the context of the German culture and language. Although the AET has been translated into English, the instrument has not been used widely in America. The reason may be that some of the concepts have not translated well into the English language or have oblique relevance in American culture. - The examples used to aid in coding would need to be edited to ensure that they are resistant to changes in the way work is done in different cultures and over time. <p>Regardless of cultural differences, use of the model may be difficult for people who are not trained in ergonomics.</p>

Exhibit ES-2 (Continued) Summary of Recommendations on Job Analysis Models	
Job Analysis Model	
<p>Common Metric Questionnaire (CMQ) (See Chapter 12)</p>	<p>The CMQ collects data via a survey administered directly to incumbents and/or their immediate supervisors. The CMQ uses an innovative matrix structure that allows for collection of a large amount of data in a relatively short period of time. The CMQ focuses on observable work behaviors, so the ratings tend to be reliable. These work behaviors are also generalizable across jobs, so it is possible to compare jobs on a large number these work behaviors and behaviorally-based scales. If SSA were to adopt a strategy involving surveying incumbents/supervisors, the CMQ would have a lot to offer.</p> <p>Effective features that SSA might want to consider:</p> <ul style="list-style-type: none"> - The matrix structure of the questionnaire. - The computerized interface to allow for effective use of the questionnaire. - The use of behavioral and observable descriptors that are easy for incumbents and supervisors to rate. - The use of descriptors that measure work context, and a wide variety of descriptors involving working with data, people, and things - The use of scales that allow for comparison across jobs. <p>Limitations for the SSA context:</p> <ul style="list-style-type: none"> - While the Generalized Work Behaviors that characterize much of the CMQ are good for describing jobs, examiners may wish to search for jobs by matching the broad abilities and skills of the claimant, and the CMQ does not include a comprehensive set of descriptors at this broad level. - Some incumbents/supervisors might not have the access to a computer to use the computerized interface like that of the CMQ. - CMQ-like items on the OIS would need to be continually updated as the meaning and relevance of job activity statements changes over time. <p>As with any incumbent/supervisor survey, SSA will need to identify and apply methods to encourage a high response rate among incumbents and supervisors.</p>
<p>Cognitive Task Analysis (CTA) (See Chapter 13)</p>	<p>The CTA approach involves using a variety of data collection procedures to ultimately identify the cognitive processes underlying a job with a particular focus on the processes that distinguish an expert from a novice. CTA can be a resource-intensive approach and is not well suited for collecting the type of data needed by SSA; thus, CTA is not recommended as a basis for SSA's methodology.</p> <p>Effective features that SSA might want to consider:</p> <ul style="list-style-type: none"> - The use of structured observation and interviews together with completion of a structured tool by the analyst - Identification of the various types of knowledge needed to do the job. <p>Limitations for the SSA context:</p> <ul style="list-style-type: none"> - CTA procedures tend to lack the detailed information needed by SSA on various physical abilities. - Using the CTA approach would require extensive training of analysts. <p>This is a labor intensive approach would be costly and unnecessary given the type of data needed by SSA.</p>

Exhibit ES-2 (Continued) Summary of Recommendations on Job Analysis Models	
Job Analysis Model	
<p>Fleishman Ability Requirement Scales (F-JAS) (See Chapter 14)</p>	<p>The primary data collection procedure for the F-JAS model involves the administration of the Ability Requirements Scales to collect data on 52 types of abilities. The procedure also involves conducting interview and observations in order to document job specific tasks, knowledges, and skills. The F-JAS or a variation of this model could be considered by SSA as a method for rating data on abilities; however, it would have to be a subset of a larger methodology that collects a broader range of data. The items and scales would also need to be revised to provide the information that disability examiners need. Note: The Ability Requirements Scales are included in O*NET with only a few modifications.</p> <p>Effective features that SSA might want to consider:</p> <ul style="list-style-type: none"> - The method of conducting interviews and observations to gather job specific information provides data for understanding the job. - The use of an instrument that focuses on generalizable “person” requirements (i.e., skills and abilities) provides data for cross-job comparison on the aspects of the job that are most directly affected by disabilities. - In general, the Ability Requirements Scales are well supported by research, although many of the scales might not be relevant for SSA and there are important constructs that are not covered by the scales. - The use of level scales anchored with observable behaviors. <p>Limitations for the SSA context:</p> <ul style="list-style-type: none"> - If SSA were to administer the Ability Requirements Scales to incumbents, the reliability of the results would likely be low relative to instruments like the CMQ because the constructs are not observable. - The F-JAS lacks some generalizable physical abilities constructs that are important to SSA. - The F-JAS scales tend to provide details on the variation of jobs at the high end of many abilities (e.g., the difference between an athlete and an astronaut), whereas SSA might be more interested in getting information about the variation in the jobs at the low end of abilities (e.g., the difference between a parking lot attendant and a cashier). <p>As with any incumbent/supervisor survey, SSA would need to identify and apply methods to encourage a high response rate among incumbents and supervisors. Note, however, that we would not recommend that SSA use the F-JAS in this manner.</p>

Exhibit ES-2 (Continued) Summary of Recommendations on Job Analysis Models	
Job Analysis Model	
<p>Functional Job Analysis (FJA) (See Chapter 15)</p>	<p>The FJA approach gathers a variety of different types of job analysis data typically collected via interview and observation but may also include other data collection procedures. Because this is the model used for the development of the DOT, it is a comprehensive, standardized, and efficient approach. While the FJA does not meet all of SSA's needs in its current form, features of this approach could likely be adapted to collect all of the data in SSA's content model. The basic approach involving observation and interview followed by analyst ratings appears to fit well with SSA's needs.</p> <p>Effective features that SSA might want to consider:</p> <ul style="list-style-type: none"> - The method of conducting interviews and observations to gather job specific information provides data for understanding the job. - The use of an instrument that focuses on generalizable "person" requirements including physical abilities provides data for cross-job comparison on the aspects of the job that are most directly affected by disabilities. - Inclusion of work context and worker environment variables. - In general, FJA is well supported by research. - The use of procedures that can be trained easily. - The procedure builds validity through the use of multiple methods, a structured framework, and structured protocols. <p>Limitations for the SSA context:</p> <ul style="list-style-type: none"> - FJA as implemented by the Revised Handbook for Analyzing Jobs (RHAI) lacks standardization on important issues such as how jobs are sampled, how interviews are conducted, how many interviews are conducted, and how many job analysts are involved. - The DOT scales lack detail on cognitive abilities and interpersonal skills. <p>The scales are appropriate for use by analysts trained in the FJA model only.</p>
<p>Job Element Model (JEM) (See Chapter 16)</p>	<p>JEM focuses on the human attributes required for superior performance on the job and collects data via focus groups, interviews, and surveys. Due to concerns with the reliability of this approach as well as its focus on superior performance, this model is not appropriate as a basis for SSA's methodology.</p> <p>Effective features that SSA might want to consider:</p> <ul style="list-style-type: none"> - The method of conducting interviews and observations to gather job specific information provides data for understanding the job. <p>Limitations for the SSA context:</p> <ul style="list-style-type: none"> - Experts have previously rated this model low in terms of reliability and standardization, so in order to be legally defensible, these claims would need to be refuted. - Although JEM is a low cost approach, it involves a significant amount of time to administer. - JEM's focus is on high performance on the job, rather than SSA's need of obtaining data on minimally-necessary abilities; however, it is possible that this could be adjusted. <p>The model does not use a standard set of generalizable descriptors, so it is difficult to compare jobs.</p>

Exhibit ES-2 (Continued) Summary of Recommendations on Job Analysis Models	
Job Analysis Model	
Occupational Information Network (O*NET) (See Chapter 17)	<p>O*NET was developed using a job analysis methodology that focuses primarily on surveys, with supplementary use of interviews and reviews of written material. However, for a variety of reasons, O*NET is not suitable for supporting all SSA disability determinations. There are, however, many aspects of O*NET that would be useful for SSA to consider as it develops its OIS.</p> <p>Effective features that SSA might want to consider:</p> <ul style="list-style-type: none"> - The use of an instrument that focuses on generalizable “person” requirements (i.e., skills and abilities) provides data for cross-job comparison on the aspects of the job that are most directly affected by disabilities. - The hierarchical arrangement and use of the content domain, so that different users can access it at different levels of detail. - A nationwide database supported and maintained by an external entity with no vested interest in particular SSA disability determinations. - In general, the scales used in O*NET are well supported by research, although many of the scales might not be relevant for SSA and there are important constructs that are not covered by the scales. - The use of level scales anchored with observable behaviors. <p>Limitations for the SSA context:</p> <ul style="list-style-type: none"> - When administered to incumbents, some items will likely have low reliability relative to instruments like the CMQ because the constructs are not observable. - O*NET ability scales tend to provide details on the variation of jobs at the high end of many abilities (e.g., the difference between an athlete and an astronaut), whereas SSA might be more interested in getting information about the variation in the jobs at the low end of abilities (e.g., the difference between a parking lot attendant and a cashier). - The O*NET database and data collection enterprise tends to focus on differentiating future-oriented, high-tech jobs requiring special skills as opposed to differentiating low skill jobs that are usually the focus of disability claims. <p>As with any incumbent/supervisor survey, SSA will need to identify and apply methods to encourage a high response rate among incumbents and supervisors. Note, however, that we would not recommend that SSA use the O*NET in this manner.</p>

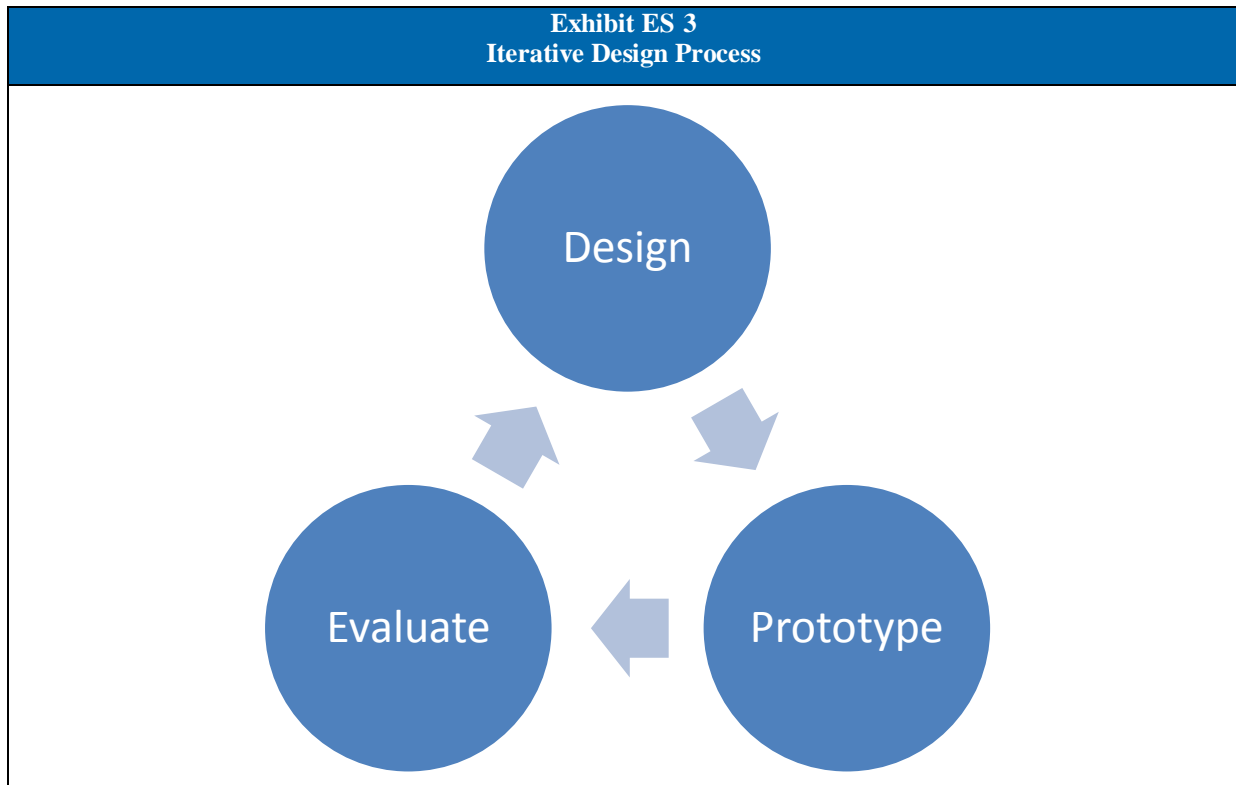
Exhibit ES-2 (Continued) Summary of Recommendations on Job Analysis Models	
Job Analysis Model	
<p>Position Analysis Questionnaire (PAQ) (See Chapter 18)</p>	<p>The PAQ is an existing job analysis model that uses a standardized 195-item instrument to collect data, which is typically completed by a job analyst based upon data collected in job observations and interviews. The PAQ collects a specific set of data that is not likely to be in line with SSA's needs; however, this model provides an example of a highly-regarded approach that uses observation and interview procedures to inform the completion of a standardized work analysis instrument. If SSA were to adopt a strategy involving observation and interview followed by analyst ratings, there are several aspects of the PAQ that SSA might want to incorporate into the OIS.</p> <p>Effective features that SSA might want to consider:</p> <ul style="list-style-type: none"> - The method of conducting interviews and observations to gather job specific information provides data for understanding the job. - The use of an instrument that focuses on generalizable work activities provides data for cross-job comparison. - In general, the scales are well supported by research, although many of the scales might not be relevant for SSA and there are important constructs that are not covered by the scales. - The focus on observable behaviors ensures greater verifiability of the findings, however, observable behaviors might not have as much utility for disability examiners. <p>Limitations for the SSA context:</p> <ul style="list-style-type: none"> - The constructs are at a level of abstraction that may not provide a clear picture of the job. <p>Scores on these scales would need to be transformed to provide meaningful interpretation for disability determination.</p>
<p>Task Inventory (TI) (See Chapter 19)</p>	<p>The Task Inventory approach involves collecting data through procedures such as review of written materials, job observation, interviews, and surveys to ultimately develop a list of task descriptions. Although this method is well validated and highly regarded, it is a time consuming approach that focuses specifically on tasks. If used by SSA, it would need to be combined with other procedures to gather additional types of data.</p> <p>Effective features that SSA might want to consider:</p> <ul style="list-style-type: none"> - The method of conducting interviews and observations to gather job specific information provides data for understanding the job. <p>Limitations for the SSA context:</p> <ul style="list-style-type: none"> - There are no generalizable constructs or scales to allow for cross-job comparison. <p>The process is too lengthy and costly for SSA's purposes.</p>

Exhibit ES-2 (Continued) Summary of Recommendations on Job Analysis Models	
Job Analysis Model	
<p>Threshold Traits Analysis (TTA) (See Chapter 20)</p>	<p>TTA collects worker trait, job demand, and job function data using data collection procedures such as review of written materials, job observations, interviews, and surveys. As this is a standardized approach, it is not likely to collect all of the data needed by SSA; however, it serves as a useful example of an approach that combines data collected through multiple data collection procedures. If SSA were to adopt a strategy involving observation and interview followed by analyst ratings, there are several aspects of the TTA that SSA might want to incorporate into the OIS.</p> <p>Effective features that SSA might want to consider:</p> <ul style="list-style-type: none"> - The method of conducting interviews and observations to gather job specific information provides data for understanding the job. - The use of an instrument that focuses on generalizable “person” requirements (i.e., skills and abilities) provides data for cross-job comparison on the aspects of the job that are most directly affected by disabilities. - The 33 traits include a parsimonious and simply worded set of constructs that might provide an effective perspective for sorting and locating jobs that people with disabilities can perform. This facility, coupled with a short job-specific task description would be a powerful combination for SSA. - In general, the TTA is well supported by research. <p>Limitations for the SSA context:</p> <ul style="list-style-type: none"> - When administered to incumbents, the TTA Scales will likely have low reliability relative to instruments like the CMQ because the constructs are not observable. - SSA would need more detail than is provided via the 33 trait focused scales (e.g., physical exertion is covered by only two constructs). - In our judgment, the TTA rating tool is not appropriate for use as incumbent/supervisor survey. It should only be used by trained analysts. <p>The TTA is not commercially available. It appears that the only way to use it is to contract with Lopez and Associates.</p>

Summary: Overarching Recommendations and Potential Next Steps. In this final section, overarching recommendations and potential next steps are provided. These proposed recommendations are based on our current understanding of SSA’s OIS project objectives and should be considered when determining future project activities.

- **Fully conceptualize multiple prototypes of the integrated system that SSA might use and compare the systems side-by-side.** It will be necessary for SSA to choose data collection and analysis features from different practices and combine them into one methodology that will serve as the integrated system for SSA. This integrated system would be referred to as the occupational analysis system (i.e., the data collection and analysis portion of the OIS). To fully understand the potential utility of a practice, it should be viewed as part of a potential occupational analysis system. This will allow SSA to see how that particular practice supports and is supported by other pieces of the system. Given that there are multiple approaches for designing an occupational analysis system, we suggest that SSA develop a complete conceptual prototype for each of these approaches. Then the various job analysis practices can be examined in the context of each of these conceptual prototypes. Later, the prototype occupational analysis systems may need to undergo a more complete iterative

design process where the prototypes are further specified, evaluated, and then redesigned in an iterative fashion on the way to a the most appropriate and effective solution. This iterative design process is illustrated in Exhibit ES-3.



- **Identify Work Taxonomy and Constructs to be Measured.** As discussed above, multiple different practices/tools will need to be combined to populate the OIS. To determine the ideal composition of the final data collection methodology, and to completely assess the relevance and usefulness of the different practices and models, SSA will need to specify the constructs to be measured during the job analysis (perhaps in the form of one or more complete conceptual prototypes as suggested above). For example, a system that focuses on skills and abilities may necessitate a different data collection procedure than a system that focuses on work behaviors.
- **Data Should be Collected and Stored Using a Computerized System or Online Application/Tool.** Project findings indicate that there is a real concern with regard to the storing and security of job analysis data. Utilization of a computerized format or online tool would provide a centralized location for data collection and minimize potential security issues/concerns of hand written paperwork. We recommend collecting data through a customized, computerized format that would minimize security issues and populate the OIS with Job Analysis Data.
- **Need to Determine Factors that are Most Important and Consider Job Analysis Practices Accordingly.** This project evaluated each of the major job analysis practices identified on a set of eleven different criteria and across numerous categories. To distinguish between practices, SSA will need to identify its most important criteria and factors before finalizing the job analysis methodology. For example, SSA may want to develop an evaluation system that includes two phases: the first phase

would involve evaluating practices using required criteria that must be met in order for the practice to be considered (e.g., legal defensibility), while the second phase would involve using the less crucial criteria, such as return on investment, to distinguish among the job analysis practices that meet the initial requirements.

- **Full Methodology Must Include a Comprehensive Set of Procedures that Include Guidelines for Maintaining Data Security and Confidentiality.** Beyond determining procedures for how job analysts must collect the data, SSA will also need to develop procedures for how the data must be handled, including procedures for ensuring confidentiality of data for the participating organizations, as well as securely submitting the collected data. While some job analysis practices may be more inclined to ensure data security or confidentiality, these types of considerations can largely be addressed by implementing specific guidelines, independent of the final data collection procedures that are selected.
- **Features of Existing Job Analysis Models Should be Adapted for SSA’s Specific Purposes and Data Needs.** This project report provides detailed descriptions and evaluations of numerous job analysis models. While several of these models may meet a number of SSA project objectives, consideration should be given to adapting features of these models to fully address OIS requirements once the content model is developed. For SSA’s purposes, additional job analysis questions or more precise questions may need to be added to an existing questionnaire to collect data granular enough to capture information specific to an occupation.
- **Need Pilot Testing to Ensure that the Final Methodology Meets SSA Objectives.** Once a draft job analysis method is created, the method must be thoroughly pilot tested. Pilot testing will ensure the final set of combined data collection procedures and/or models appropriately measure the desired core tasks, work activities, contextual characteristics and minimum KSA. Based on pilot test results, refinements can be made to the methodology before analysts begin collecting ‘live’ data to populate the OIS.

Each of these recommendations should inform the development of final job analysis methodology as well as future related BPA activities.

SECTION 1: Project Background

Section 1 provides information on the project background and is comprised of the following three chapters:

Chapter 1: Project Overview

Chapter 2: Call 0001 Project Methodology

Chapter 3: Job Analysis Practice Review Results Introduction

These three chapters provide information about the project background and purpose, the detailed project methodology used to perform each task and subtask within the Call 0001 project, and the results template used to structure the results chapters in this report (see Section 2 and Section 3).

Chapter 1: Project Overview

1.1 Introduction

The Social Security Administration (SSA) is undertaking a project to develop a new occupational information system (OIS) tailored specifically for SSA's disability programs and adjudication process. The Occupational Information System (OIS) project will provide SSA with a long-term replacement for the information that the agency currently uses in its disability evaluation process and obtains from the Dictionary of Occupational Titles (DOT) and companion volumes, including the Selected Characteristics of Occupations (SCO) and the Revised Handbook for Analyzing Jobs (RHAI). As part of this project, SSA awarded ICF International with a Blank Purchase Agreement (BPA) in September 2010. The BPA includes separate Call Orders with an overarching purpose to assist SSA in the development of the business processes and standards required to recruit, train, and certify job analysts. This work will ensure potential job analyst candidates will be able to collect the detailed occupational information that will serve as the basis for development of an SSA-specific OIS.

The purpose of this Call Order (Call Order 1) is to assist SSA with the OIS project by performing tasks involving, but not necessarily limited to, gathering information on and evaluating job analysis practices and strategies. This work will be used by SSA to collect the detailed descriptions, specifications, and requirements on jobs that exist throughout the labor market of the United States. The job data collected will serve as the basis for development of an SSA-specific OIS.

In this Final Report, a detailed description of the Call Order 0001 project methodology is provided along with a comprehensive summary of Call 0001 results, including the results of a systematic evaluation of each of the job analysis practices by a panel of experts. We conclude the report by providing specific recommendations that will assist SSA in determining how to operationalize an effective strategy for developing a job analysis methodology.

1.2 Project Background

Determining disability is an important process. The decision on whether a claimant is "disabled" has a substantial impact on his or her life. The decision process also has an impact on our nation's economy, as a change in the process or the information used in the process could result in a shift in the funding needed to pay for the disability program. Given these high stakes, the information and method that SSA uses to develop its OIS will be highly scrutinized. Yet, the issue of determining disability is complicated. The process involves considering diagnostic, medical, and functional evidence and other information about the claimant's circumstances relative to regulatory guidance and available data on occupations. The process relies on the quality of its inputs: from the accuracy of clinical judgments, to the validity of the occupational data.

SSA currently uses a multi-step process to determine whether an individual qualifies for disability. Two of these steps require occupational information. These steps involve determining whether the individual:

- is able to perform any of the jobs that they have performed during the last 15 years
- is able to perform any other jobs that exist in significant numbers in the national economy, after considering age, education, past work experience, transferable work skills, and functional abilities.

If the answer to either of these questions is "yes" and none of the other conditions for disability are met, then the individual does not qualify for disability. If the answer to both of these questions is "no" and the individual meets the other conditions for disability, then the individual qualifies for disability.

Currently, these two steps depend on the occupational information provided by the Dictionary of Occupational Titles (DOT) (U.S. DOL, 1991). To determine whether the individual can still perform previously performed work, the SSA uses the DOT to locate and provide a standard description and ratings of the jobs the individual has performed. To determine whether the individual can perform other work, the SSA uses the DOT to identify jobs that can be performed by persons matching the individual's vocational profile (i.e., his or her age, education, past work experience, and transferable work skills). Data linked to the DOT are then used to determine whether the jobs exist in substantial numbers in the economy.

While the DOT is an established source for occupational information, SSA stakeholders realize that DOT does not fully meet SSA's needs. The Department of Labor (DOL) developed the original DOT in the 1930s to provide a tool for matching people with jobs and was later adapted for the purposes of making disability determinations. For the SSA to continue to successfully meet its goals, however, the agency needs up-to-date data. The world of work has changed since the last update to the DOT, and changes will continue to occur as supply, demand, technology and globalization impact the type and number of jobs in the U.S. economy. The DOL has no plans to update the DOT, and O*NET, DOL's replacement of the occupational information system, does not meet SSA's needs. The result is that SSA needs another source for the data.

In response, SSA began work on the OIS development in 2008 and is conducting the project in many phases over the next several years. SSA is currently in the Research and Development Phase that will include the development of a content model and survey instruments specifically designed and created for use by SSA job analysts during data collection. To create the content model, SSA solicited and received advice and guidance from the Occupational Information Development Advisory Panel, disability adjudicators, members of stakeholder organizations, and internal SSA components responsible for disability research, policy development, hearings and appellate operations. Currently the OISD Workgroup, internal to SSA, is refining the list of elements to collect, test and include in the final job analysis instrument. SSA estimates the final version of the instrument will be available in December 2011.

1.3 Purpose of Call Order 0001

ICF International has been contracted by SSA to execute Call Order 0001. To develop its OIS, SSA needs a detailed methodology and strategy that would permit analysts to perform job analysis on jobs that exist throughout the labor market of the United States. The purpose of Call 0001 was to perform the research needed to develop and support this methodology. The Call 0001 approach included a review of relevant literature (e.g., reports, white papers, technical and scientific journals), consultation with experts in related fields, and the development of a specific framework and criteria for evaluating various job analysis approaches and identifying those most suitable for addressing SSA's OIS objectives.

This Call Order 0001 Final Project Report provides a review and evaluation of the various job analysis practices that might best meet SSA's needs. Historically, job analysis is performed in a number of disciplines by individuals with various background and expertise including vocational rehabilitation counselors, physical and occupational therapists, human resource professionals, ergonomists, occupational health nurses, occupational health physicians, safety professionals, industrial psychologists, disability managers, job placement specialists, neuropsychologists, exercise physiologists, athletic trainers, case managers, risk managers, return-to-work specialists, and claims, or insurance, adjusters. Each type of professional approaches job analysis in a somewhat different manner—for example, physical and occupational therapists tend to focus on the physical, psychomotor, and environmental demands of work. In contrast, human resource professionals tend to approach job analysis with more emphasis on the cognitive and affective requirements for work, while safety professionals focus on the environmental aspects. Call Order 0001 results provide an overview of the spectrum of job and work analysis data collection procedures available across related disciplines. This Final Project Report also includes analysis

and recommendations that provide SSA with the crucial direction needed to identify the appropriate practices that will satisfy SSA's needs in developing the new occupational information.

Call Order 0001 consisted of two main tasks: 1) Task Meetings/Discussions and 2) Review and Evaluation of Job Analysis Practices. Task 2 is further broken down into three subtasks:

- Documentation of Detailed Project Methodology
- Conduct Literature Review, Background Research and Develop a Recommended Methodology for Job Analysis
- Documentation for SSA– Literature Reviews and SME Interviews/Focus Groups

In Chapter 2: Call 0001 Project Methodology, a detailed description of Task 1 and the activities under each subtask of Task 2 is provided. A comprehensive description of all planning, development and data collection procedures are provided for each topic.

Chapter 2: Call 0001 Project Methodology

Task 1 – Task Meetings/Discussions

Given the consequence of the OIS project and Call Order 0001, SSA and ICF have been committed to partnership and frequent communication through regular summary progress reports, telephone conference calls, and meetings. This dialogue started at the Project Kick-Off Meeting on October 20, 2010. SSA project stakeholders and key ICF personnel met at the SSA Headquarters building in Baltimore, Maryland to discuss of the scope of work and review the proposed approach and timetable to complete the services requested. During the meeting, SSA provided an overview of the project background as well as key stakeholder groups. ICF presented a preliminary outline of the Call Order 0001 literature review methodology, the plan to conduct Subject Matter Expert (SME) focus groups, and the resulting job analysis practices evaluation process. SSA reviewed the presentation and example forms provided by ICF at the Kick-Off and then provided feedback.

Subtask 1.1 Contacts with the SSA Project Officer

Following the Kick-Off Meeting, SSA and ICF had regular and candid discussions regarding SSA's vision of the Call 0001 deliverables, ICF's project plan, the research timeline, and final results. These discussions typically occurred in weekly or bi-weekly meetings. The consistent and open communications were extremely beneficial and facilitated ICF's progress on Call Order 0001. For example, the conception of Call Order 0001 deliverables was refined. Originally, the project plan was designed to develop a single solution job analysis method that would be tailored to the work analysis instrument developed by SSA. Instead, this Final Report provides an evaluation of the spectrum of job and work analysis practices including existing models and data collection procedures available to better meet SSA's current needs. Our findings will be used by SSA to create a comprehensive job analysis methodology that meets the requirements of the work analysis instrument SSA develops.

In addition to regular meetings, the ICF team provided SSA with meeting minutes and monthly project updates. The meeting minutes recorded main points, action items as well as challenges discussed during meetings with SSA. The monthly progress reports have outlined:

- Work accomplished during reporting period
- Major milestones met in the project
- Anticipated activities for the next reporting period
- Overall technical assessment of the project to date
- Shortfalls or outstanding issues
- Proposed corrective actions to keep the project on schedule, if needed.

These reporting procedures, along with frequent contact with the project management team, ensured that SSA stayed well-informed of task completion, and any challenges or issues that required immediate attention.

Task 2 – Review and Evaluation of Job Analysis Practices

The purpose of this task was to conduct a detailed research effort to determine the most efficient and practical approach to developing a methodology to perform job analysis in various geographical locations throughout the United States. Because of the wealth of research conducted by job analysis experts that is available, the intent of this research was not to test each job analysis approach or instrument, but rather to examine the available research and published literature in order to evaluate job analysis practices. Each of the three related subtasks is described below.

Subtask 2.1—Documentation of a Detailed Project Methodology

The goal of this Chapter is to provide SSA with a full understanding of our steps for conducting the research and analysis that led to our final recommendations.

Subtask 2.2—Conduct Literature Review, Background Research and Review of Job Analysis Practices

Subtask 2.2 involved conducting a literature review, facilitating focus groups and analyzing data to provide expert guidance in the development of a recommended methodology for job analysis. For this subtask, the following activities were completed.

- Conduct focus groups with job analysis professionals
- Conduct a literature review
- Analyze data
- Prepare draft job analysis practices report.

The steps performed in each of the activities are detailed in the following sections.

Activity 2.2.1 Conduct Focus Groups with Job Analysis Professionals

Input from job analysis experts was required for both Call Order 0001 and Call Order 0002; thus, a single set of focus groups was conducted to address some the relevant issues for both Call Orders. For these focus groups, we gathered data from job analysis experts from a variety of disciplines in order to discuss features of a sound job analysis methodology. For Call Order 0002, we collected data to identify minimum qualifications needed to perform job analysis and uncover recommended strategies and techniques to design and deliver job analyst training. The focus group technique was chosen for this activity because focus groups provide an opportunity to elicit information likely to emerge through group discussion and can be an incentive for professionals to participate as it gives them a chance to share with and learn from others. All focus group sessions were conducted over the phone. Using this approach helped to reduce the resources needed to conduct the focus groups, as well as to maximize the number of experts who would be available to contribute to the discussion for each Call Order. Across the focus group process, ICF engaged in the following steps:

- Protocol Development
- Focus Group Recruitment
- Focus Group Scheduling
- Focus Group Sessions
- Focus Group Data Analysis

Details of the processes we used in each of these steps as well as the rationale behind the selected project methods are described in the following sections.

Protocol Development

ICF began the protocol development process by identifying the major topics to be covered during the focus groups for both Call Order 0001 and Call Order 0002. For Call Order 0001, the aim was primarily to identify and to determine how to evaluate varying job analysis practices, while in Call Order 0002, the aim was to gather insight on job analyst qualifications and approaches to training. Based on the purposes of each of the two Call Orders, the following draft list of topics for the focus groups was developed:

- **Call Order 0001:**
 - ◆ Selection of Occupations & Participants
 - ◆ Job Analysis Data
 - ◆ Job Analysis Procedures
 - ◆ Job Analysis Practice Evaluation Criteria
- **Call Order 0002:**
 - ◆ Job Analyst Qualifications
 - ◆ Job Analyst Training Approaches

After this draft topic list was developed and submitted to SSA for review, ICF created a draft set of questions related to each of the identified topics. For each topic area, consideration was made regarding what information we needed to address the purposes of the Call Orders and what information we could likely collect from the participants. Based on that, questions were written that would solicit the desired information during the focus groups. The questions and topic areas were refined as the nature of the project was clarified through discussion with SSA during the first few weeks of the project. In particular, it was determined that the selection of occupations and participants was outside the scope of the SSA job analyst role; thus, this topic was removed from consideration. All other topics were retained, although the job analysis data and job analysis procedure questions were combined under a single topic area in an effort to streamline the protocol and reduce its overall length. Thus, the final Call Order 0001 topics included job analysis procedures and practice evaluation criteria, while the Call Order 0002 topics remained unchanged from the draft list and included job analyst qualifications and training approaches.

Over a period of several weeks, the draft protocol underwent a series of additional revisions based on reviews by the leads of both Call Orders. In general, these revisions aimed to ensure the following criteria were met for each of the questions in the protocol:

- *Question content*—Does this question specifically address one of the identified topic areas?
- *Question clarity*—Is this question stated in a straightforward manner?
- *Question relevance*—Does this question pertain to the job analysis needs of SSA?

After the major questions were established, introductory material, information on the project background, and a list of ground rules were added to the beginning of the protocol, while a summary was added as a closing statement. This supplementary information was included in the protocol to ensure uniformity in the information shared by facilitators across focus group sessions. Where applicable, probe questions were added to the primary questions to assist the facilitators in drawing out more information from participants. Because the focus groups were intended to last only one hour, the final revision involved streamlining the protocol and removing any non-key questions (i.e., questions that were not specifically related to the protocol topic areas or SSA's job analysis needs, or questions that would likely elicit redundant responses). Finally, a participant version of the protocol was created, which involved removing the probe questions and introductory material intended for the facilitator's use.

To assist participants in clarifying the qualifications of a job analyst, ICF developed a draft list of knowledge, skills, and abilities (KSAs), as well as a description of the SSA job analyst role to clarify the extent of this position. This document was distributed to participants prior to the focus groups for their review, so that during the focus group, they could comment on the job analyst KSAs and suggest any changes. This draft list was developed by a member of the Call Order 0002 team, revised by a second team member, and reviewed by the team lead. This document then served as a supplement to the protocol.

The final topic areas and focus group questions are presented in Exhibit 2-1. The full facilitator protocol is presented in Appendix A. It should be noted that not all probes in the facilitator version were asked in every focus group. The probes were used only when needed to draw out additional information.

Exhibit 2-1 **Final Focus Group Protocol Questions**

1. Introduction

- In 30 seconds, please briefly introduce yourself and briefly describe what you do in your job.
- Please briefly describe the types of data that you typically collect, or have collected, during job analyses.

2. Job Analysis Procedure

- Which procedures do you typically use to gather job analysis data?
- How do you know which method(s) are appropriate for a given situation and what types of tools do you use to collect the data?
- What are some key considerations when conducting job analyses for the purpose of making disability determinations?
- What procedures should be in place to ensure that consistent and reliable data are being collected across analysts and locations?

3. Practice Evaluation Criteria

- What are the most important criteria to consider when evaluating different job analysis practices and data collection procedures?

4. Job Analyst Qualifications

- As part of the data collection process, SSA will need to hire job analysts around the U.S. If you have not already done so, please take a moment to look over the draft list of knowledge, skills, and abilities needed to be an effective job analyst. Broadly speaking, do you suggest making any additions, changes, or deletions to this list?
- What certification, certificate and/or training programs does your field require in order to conduct job analysis?
- What should the minimum qualifications be for a job analyst, considering all analysts will receive job training from SSA?
- What are the benefits and disadvantages to consider with the use of each of the following training approaches for a large-scale training initiative?

Exhibit 2-1 (Continued)
Final Focus Group Protocol Questions**5. Job Analyst Training Approaches**

- In training candidates to conduct job analysis, what are some key factors that need to be emphasized during the training?
- What training programs, practices or strategies are available for training job analysts, considering the training would need to be replicated in various geographical locations?
- What resources should be introduced in a training to prepare individuals, possibly with no prior experience, to conduct job analysis at a national level?

6. Summary

- Thank you very much for your time today. Are there any additional resources that you can recommend before we end the focus group?

Focus Group Recruitment

Given the diverse nature of job analysis practices, it was important to gather perspectives of experts from a broad range of fields that perform job analysis. Based upon a preliminary review of job analysis literature as well as the job analysis expertise of ICF, its expert subconsultants, and SSA, ICF developed a list of disciplines that frequently perform job analysis. These fields included the following:

- *Vocational Rehabilitation*—uses job analysis for purposes including prevention of disability, rehabilitation planning, and disability accommodation (Lysaght & Shaw, 2011)
- *Physical and Occupational Therapy*—uses job analysis for purposes including evaluating injured workers, planning rehabilitation, developing transitional work plans, and conducting environmental modification and risk management programs (Lysaght, 1997)
- *Human Resources*—uses job analysis for purposes including employee selection, training, appraisal, and establishing compensation rates (Brannick, Levine, & Morgeson, 2007)
- *Industrial/Organizational Psychology*—uses job analysis for purposes including employee selection, training, appraisal, and establishing compensation rates (Brannick, Levine, & Morgeson, 2007)
- *Ergonomics*—uses job analysis to identify specific stressors and risks in the job (Keyserling, Armstrong, & Punnett, 1991)
- *Occupational Health*—uses job analysis to identify safety concerns and job hazards and to identify potential preventive measures (Canadian Centre for Occupational Health and Safety, 2008)

Although practitioners in each of these fields may have very different perspectives on the purpose and practice of job analysis, ICF's efforts to gather feedback from all of them will enable us to present the most comprehensive review of effective practices in job analysis and training methods that would serve SSA's purposes.

In order to recruit a diverse sample of experts within the identified fields, ICF employed a three-pronged approach to establish the list of potential participants.

1. We leveraged the connections of ICF team members within the I/O Psychology and HR community, as well as the connections of our partners within Vocational Rehabilitation, Physical and Occupational Therapy, Ergonomics, and Occupational Health. Many of these experts had served as subject matter experts on previous projects with ICF.

2. We performed internet searches to obtain contact information for distinguished researchers and practitioners of various forms of job analysis. We targeted experts in each field based on the relevance of their publications, their academic or corporate affiliations, their professional certifications, and their involvement in professional organizations. After some initial searching, a list of potential participants and rationale for their selection was provided to SSA for review and approval.
3. The final component of the sample was provided by SSA based on recommendations of their own staff and the members of the OIDAP. ICF placed high priority on these recommended experts when attempting to recruit participants. ICF then performed additional searches as previously described to ensure a sufficient number of potential participants.

Contact information and other pertinent details for each of the potential participants were combined in an Excel spreadsheet to facilitate the recruitment of participants and the scheduling of focus groups. Within the database, tabs were created for each of the target fields (see bulleted list above), and participants were listed within the tab that represented their respective field.

Focus Group Scheduling

ICF made efforts to schedule participants from similar fields together in a focus group, rather than mixing experts in different fields. Although mixing expertise within focus groups might have provided for some interesting dialogue, we made the decision not to mix expertise to ensure the dialogue would be more focused and to ease the delineation of how job analysis is performed within each field. ICF also limited the phone-facilitated focus groups to 2 to 3 participants to ensure manageability of the conference call within the one-hour timeframe.

To schedule the participants, ICF team members called the expert directly, explaining the purpose of the project, the reason we selected them, and what participation would involve. Example talking points used to recruit participants are provided in Exhibit 2-2.

Exhibit 2-2 Talking Points for Focus Group Scheduling

1. Greet the person using their name and title (“Hello Dr. Smith”).
2. State your name slowly and that you work for ICF International, a research-based consulting firm headquartered in Fairfax, VA.
3. Right off state how you received their name or why we are seeking their participation so the person doesn’t think you are a sales call (e.g., provide the name of the person who referred them to us; they wrote a book chapter entitled...; participated in another ICF project).
4. State that you are working on a project for Social Security Administration (SSA) where we are trying to gather the perspectives of different fields of study, including “*their field of study*,” on the topic of analyzing and measuring components of jobs (referred to commonly as “job analysis”). If they say they do not conduct or teach job analysis or do not know what it is, ask them if they conduct or teach any evaluation of jobs, positions, work environments or work tools.
5. Explain that we (the ICF team) are conducting this project for SSA as part of a larger effort by SSA to development an Occupational Informational System that SSA will eventually use to make disability determinations. The first step in this larger effort is to determine what expertise individuals will need to analyze jobs and collect the relevant job information for the OIS database.

Exhibit 2-2 (Continued)
Talking Points for Focus Group Scheduling

6. For this SSA project, we will be collecting data from multiple sources including interviews, literature reviews, benchmarking and these focus groups which is why we are contacting them now. State that the reason you are calling is that you would like them to be part of one of these short, phone-based focus groups. Explain the focus groups will consist of 2-3 other experts from *their field* or a closely related discipline (e.g., vocational rehab/industrial rehab). Acknowledge that you know their time is valuable and that we really appreciate them considering our request. These phone-based focus groups should take less than an hour and provide an opportunity to meet others in their field while contributing to our research.
7. Ask if they have any questions.
8. If they ask about topics covered in the focus group, explain we will be looking to gather their thoughts on important components or considerations in the conduct of job analysis and the qualifications an individual should have before becoming a job analyst. Also, let them know that we will send them a copy of the protocol questions in advance of the focus group along with a draft list of knowledges, skills and abilities for job analysts for which we will ask them to comment in the focus group.
9. Explain that in addition to meeting other experts in their field, to show our appreciation and as a benefit to participate, we will provide a summary report of our findings across all of the focus groups.
10. Ask them if they would be interested in giving us an hour of their time over the phone, within the next week. Provide a list of 2-3 dates and timeslots. If none of those work, then provide others.
11. Confirm their email and contact information. State that you will send them an email by tomorrow confirming the date and time they selected and providing the toll-free conference line, protocol questions, and other materials to provide context to the call.
12. If they state that they do not have time, ask if it would be okay to consider them for a short interview in two weeks.
13. Send the email confirming their date and time of participation. Include the conference line and passcode. Attach the protocol and KSA list to the email. Add a read receipt to every correspondence.

When an individual agreed to participate, he or she was scheduled for a one-hour time slot. Microsoft Outlook invites were then sent with the meeting time, the facilitator's name, and toll-free conference line information. An example of the invite language is provided in Exhibit 2-3. The invite was sent to the participants and to the SSA client so that representatives of SSA could listen to the call. Two documents were also attached to the invite: the participant version of the focus group protocol and a worksheet with a draft list of KSAs/qualifications for job analysts. Participants were asked to review the KSA/qualifications list and propose revisions based on what is required within their field to perform job analysis.

Exhibit 2-3
Sample Email Invitation for Focus Group Participants

Hello Participants,

Thank you for agreeing to participate in ICF's focus groups on Job Analysis for the Social Security Administration. Attached to this invitation you will find two documents. The first is the protocol we will be using for the call. Feel free to read it ahead of time and follow along on the call. It is not necessary that you prepare answers, but you can if you wish. The second document is a draft list of Knowledge, Skills, and Abilities that we believe are relevant to SSA's Job Analyst positions. Please take some time to review it in advance of the call. If you are interested in providing detailed revisions to the document, please make those directly in the document and email it back to me, as we likely won't have time to discuss them in the focus groups.

[Name of facilitator] will be facilitating the call. He/She can be reached at [phone number] or by email at [\[email\]@icfi.com](mailto:[email]@icfi.com). We will use a conference line for the focus group. The toll-free number is provided below:

Toll-free number:

Passcode:

We look forward to speaking with you on [day of call].

Thank you,

[Name and Contact Information of Coordinator]

In total, 12 focus group sessions were scheduled with 31 total participants. In our original proposal for this Call Order, we had planned to conduct a total of 4-5 focus group with 4-6 participants per group for a total of 16-20 participants; however, once the protocol was developed and we realized the amount of information we wanted to cover in an hour-long interview, we decided to reduce the number of participants to 2-3 per group and increase the number of focus groups. We also increased the number of focus groups that we conducted to ensure we had a representative set of participants from all related disciplines. We stopped conducting focus groups when most of the information collected was redundant with information collected in previous focus groups. A summary of the focus group sessions, including the primary disciplines of participants, the date and time of the session, and the number of participants, is presented in Exhibit 2-4.

Exhibit 2-4
Summary of Focus Group Sessions

Primary Discipline	Date	Time	Number of Participants
Occupational Therapy/ Vocational Rehabilitation	November 19, 2010	11:00 AM EST	2
Ergonomics	November 19, 2010	2:00 PM EST	3
Vocational Rehabilitation	November 24, 2010	3:00 PM EST	3
Physical & Occupational Therapy/Ergonomics	November 29, 2010	1:00 PM EST	3
Vocational Rehabilitation	November 29, 2010	3:00 PM EST	3
Vocational Rehabilitation	November 30, 2010	3:00 PM EST	2
Human Resources	December 1, 2010	1:30 PM EST	4
Human Resources	December 1, 2010	5:00 PM EST	2

Exhibit 2-4 Summary of Focus Group Sessions			
Primary Discipline	Date	Time	Number of Participants
Industrial/Organizational Psychology	December 2, 2010	4:30 PM EST	2
Industrial/Organizational Psychology	December 9, 2010	10:00 AM EST	3
Physical Therapy	December 9, 2010	11:00 AM EST	1
Vocational Rehabilitation/ Occupational Therapy/Ergonomics	December 13, 2010	1:30 PM EST	3
Total Participants			31

Conduct Focus Groups Sessions

Each focus group session had an assigned facilitator and recorder. Prior to the call, these team members reviewed the available background information on participants (e.g., names, disciplines, organizations, and positions), confirmed the conference call information, and gathered the documents to be used on the call, including the protocol and job analyst KSA worksheet.

Facilitators began the calls by introducing themselves and the project and explaining the ground rules of the session, which are presented in Exhibit 2-5. The facilitators then used the protocol to guide the calls, asking each of the major questions contained in the protocol and using the probes as necessary to gather more information. Due to the large amount of information to be covered in an hour-long session, the facilitators had to ensure that the discussion stayed on track and did not center on any single question for too long. As noted in the ground rules, participants were reminded that they could contact the facilitator later if they had additional information they wished to discuss.

Exhibit 2-5 Focus Group Ground Rules
<ul style="list-style-type: none"> • To keep this focus group to 1 hour, please be concise in providing your responses to allow for everyone to participate. Please note that as the facilitator, I may have to interrupt at times to move us to the next questions. If that occurs, I may ask you to send your further thoughts to me via email. • Respect each other's opinions. I ask that you withhold your judgments about others comments. • Avoid interrupting other participants. • Keep information shared here confidential. We intend to remove individuals' names and other identifying information from our notes. • Please stay on topic and provide responses that relate directly to the question asked. <p>Participants were then asked if they had any additional ground rules they would like to add to the list that was provided.</p>

The recorders typed their notes in the participant version of the protocol. This document served as an ideal template for the notes, since it contained all of the focus group questions without the suggested probes and additional information intended for the facilitator's use. The recorders were asked to focus on typing all of the major points that were discussed. They did not attempt to capture everything that was said verbatim; instead, they recorded all of the key points of discussion so that the notes represented a concise and accurate portrayal of the focus group session. In addition, the conference call was recorded

using the recording function available from the conference call line, so that an audio file of the full conversation would be available as a backup source of information.

Any materials, forms, and tools mentioned by participants during the focus groups were requested by the facilitators. The facilitators also indicated to the participants that follow-up calls may be conducted if additional information was needed regarding any concepts that were discussed in the focus groups. Facilitators concluded the sessions by thanking participants for their time and input, as well as reminding participants that they could contact them if they had any questions, comments, or additional information to share.

Analyze Focus Group Data

Identification of Individual Focus Group Themes. Our team analyzed participant responses by protocol question to identify the key findings that were discussed. Important points made in the focus group that addressed the respective protocol question were recorded following the dialogue for that given question. Prior to beginning the analysis process, a practice session was held to establish clarity and consistency in the analysts' approach. First, each team member independently reviewed and identified important points in the documentation from the same focus group. After this initial review, the team members met to discuss the key findings that were identified for each question. Discrepancies in the identified important points were discussed and resolved, and further clarification was provided to remove ambiguity in the process. For example, the focus groups were intended to capture trends and current practices used by job analysis professionals and were not intended to measure the strength or quantification of the findings. Thus, the team decided to use an inclusive approach to recording the important points, so that even if a single participant made a particular comment, it could be recorded as an important point if it provided a point that was pertinent to the protocol question. Due to the nature of the discussion in some of the sessions, participants occasionally addressed a different protocol question than the one most recently asked by the facilitator. For example, if the facilitator asked about the types of job analysis data that participants usually collect, the participants may have also provided some information on the procedures for how those data are collected. When this occurred, important points were moved to the most relevant protocol question to ensure all findings were grouped in an organized and easily interpretable manner. During the analysis, if a recorder saw a typographical error or an incomplete thought in the dialogue, the recorder corrected the error or completed the thought. The documents including both the dialogue and identified themes were saved as the analyzed version of the document. The analyzed documents were distributed to the facilitator of each session to review the identified themes and ensure they accurately reflected all of the key findings from the focus groups.

Identification of Keywords for Call Order 0001 Literature Review. During their review of the notes, facilitators were also asked to identify keywords from the focus group sessions that would be used to inform the Call Order 0001 literature review. Keywords could relate to any of the literature review database categories, such as types of job analysis data, job analysis practices, job analysis tools, job analysis models, and so forth. The keywords were intended to indicate topics on which more information should be gathered, as they represented new concepts outside of those that had already been identified as data entry options in the literature review database.

Facilitators recorded each keyword, its database category (e.g., type of data, job analysis model), the discipline of the expert who mentioned the keyword, and the date and time of the focus group when it was mentioned in a shared excel spreadsheet. This process helped to ensure that the concepts discussed by the job analysis experts from varying disciplines were also captured in the literature review component of the project.

Discussion of Focus Group Findings. The final step of the data analysis process involved conducting a meeting with all facilitators and recorders who participated in the focus groups to jointly examine and refine the collective findings. While each facilitator/recorder team was well versed in the issues of their

respective sessions, no one team had complete knowledge of overarching themes throughout the focus groups conducted with participants from varying disciplines.

Prior to the meeting, all participants were asked to review the analyzed documents from each of their calls to remind them of the findings from their individual sessions. Additionally, they were asked to review the document containing the aggregated points across calls to familiarize themselves with the findings across all of the focus groups.

During the one and a half hour meeting, a facilitator led the discussion so that the findings from each of the protocol questions were addressed. Participants discussed points from their calls, shared interesting findings, provided suggestions for changes to the document of combined themes, and noted recommendations or issues to keep in mind for the remaining project tasks. To ensure that the recorder could focus fully on capturing the discussion, a recorder who had not been involved in the focus groups took notes throughout the session. The notes contained the major points that were discussed and highlighted all identified action items.

Following the call, the recorder cleaned the notes and sent them to the facilitator to review. Based upon feedback gathered during the meeting, the facilitator made revisions to the document of themes across focus groups. Overall, this focus group data analysis method resulted in an effective, straightforward procedure for aggregating and documenting the qualitative data gathered through the focus groups.

Activity 2.2.2 Conduct a Literature Review

The purpose of this activity was to identify a broad set of job analysis practices that could potentially be included in the job analysis method. We searched for and obtained information on practices that address the issues most applicable to SSA's needs. A description of the steps we took is provided for the four following activities:

- Create literature review database
- Develop search strategy
- Screen job analysis sources
- Train data entry team and enter articles.

Create Literature Review Database

We began this activity by developing 1) a framework for describing job analysis practices and 2) criteria for evaluating job analysis sources (i.e., screening criteria). The goal of the framework was to comprehensively describe and categorize the various features of job analysis practices across approaches and disciplines. Our job analysis experts drafted the literature review framework based on their knowledge of job analysis practices as well as a preliminary review of related literature. The draft framework was then sent to SSA for feedback and additional refinements. The final framework can be found in Appendix A.

The final job analysis practices framework was used as the underlying structure of our Microsoft (MS) Access Literature Review database. The database was used as a tool to document the information found across all job analysis literature sources. A MS Access data-entry form (see Appendix B) was created that contained check boxes and text boxes associated with all framework categories to aid the ICF literature review team in entering all job analysis information into the database in a user-friendly way.

As part of developing the framework for describing job analysis practices, the ICF team discussed the most appropriate and useful way to organize and enter the information collected in the literature review. For example, the source could be used as the organizing mechanism of the MS Access database (i.e., the framework categories would be completed only one time for each source, no matter how much or little

information is described in that source). In this type of arrangement, the database would function similar to an annotated bibliography, such that the data output would present the source reference followed by content described in that source. Another option would be to organize the literature review by content found in each source. The ICF team thought through the main focus of our Call 0001 project and ultimately decided that the most appropriate organizational scheme for the literature review database was by data collection procedure (e.g., job observation, phone focus group), since the main focus of this effort was how to most effectively collect job analysis data.

In the literature, information on how to collect job analysis data comes in two forms. First, there are sources that describe data collection procedures generally (e.g., interview, job observation). These types of sources provide examples of job analysis data and other considerations when collecting job analysis data through the focal data collection procedure. The second way in which information on how to collect job analysis data is found in the literature are through sources that describe established job analysis models (e.g., PAQ, AET, FJA). These models prescribe a specific one or set of data collection procedures to collect job analysis data. These models may or may not also be associated with a specific instrument or taxonomy that prescribes what types of information to collect. Our focus in presenting these models was the way in which the data are collected and the information provided (e.g., resources, quality and data considerations) are made with regard to the one or set of data collection procedures. As part of the report, we included the types of information that have been collected using the model to help SSA in making an informed choice once the SSA instrument is developed.

Paralleling these two ways job analysis practice information is presented in the literature, we have two sections of job analysis results chapters in our final report. We detail information about 6 general data collection procedures (e.g., structured interview) in Section 2 of this report, and we present information on the 9 most relevant established job analysis models (e.g., PAQ) in Section 3 of this report.

To be comprehensive in the general data collection procedure chapters (i.e., Section 1), we combined literature that described the procedure generally with literature that described using the procedure as part an established model. This allowed the project team to provide a more thorough review of job analysis data collection procedures in Section 2 of this report. For sources that described more than one way to collect job analysis information, the framework categories were completed for each data collection procedure type. For example, a journal article that describes a job analysis that entails a(n) 1) review of job descriptions, 2) job observation, and 3) incumbent interview would be entered as three separate entries in the MS Access database. This type of arrangement would allow the data output to be organized for each data collection procedure (regardless of source), which maximizes the ease of summarization and comparisons across job analysis practices. Because the focus of this project is on job analysis practices, job analysis instruments or taxonomies that were not associated with a specific one or set of data collection procedures were not included in our review. These types of sources are most useful for the development of the job analysis instrument (i.e., specify the type of data collected) and not to the current effort.

In addition to the framework for describing job analysis practices, the ICF team developed criteria for evaluating the numerous articles identified through the literature review. These screening criteria were used to evaluate the appropriateness of each job analysis source collected in relationship to the current effort. The screening criteria were drafted based on expert knowledge and were reviewed and revised by the ICF team. The final screening criteria are listed in Exhibit 2-6.

Exhibit 2-6 Literature Review Screening Criteria	
Relevancy of Topic to Project <ul style="list-style-type: none"> ▪ Very relevant ▪ Relevant ▪ Somewhat relevant ▪ Not at all relevant 	Sufficient Detail to Draw Conclusions about Method <ul style="list-style-type: none"> ▪ Significant methodological detail ▪ Adequate methodological detail ▪ Some methodological detail ▪ No methodological detail
Quality of Article <ul style="list-style-type: none"> ▪ Peer-reviewed source ▪ Non-peer reviewed, but reputable/expert source ▪ Non-expert publishing source ▪ Unknown publishing source/Questionable writing quality 	Up-To-Date Information <ul style="list-style-type: none"> ▪ Information is current (2000 or later) ▪ Information is outdated but still useful ▪ Information is outdated and somewhat useful ▪ Information is outdated and no longer useful

Develop Search Strategy

The goal of our search strategy was to identify a broad range of relevant job analysis literature from diverse disciplines. Appropriate sources were quality and current articles, technical reports, websites, etc. that discussed a job analysis model, procedure, or practice with enough detail to allow us to draw conclusions about the practice. Sources that, for example, discussed the benefits of job analysis in general, while interesting, were not considered appropriate for the literature review database. Based on focus group findings, discussions with SSA and our preliminary searches, we targeted specific topic areas in our literature review. Example topic areas provided in Exhibit 2-7 served as our initial keywords when conducting searches.

Exhibit 2-7 Example Literature Review Topic Areas that Served as Keywords	
<ul style="list-style-type: none"> ▪ Job observations ▪ Surveys (paper-and pencil or web-based) ▪ Review of written materials ▪ Interviews (face-to-face or phone) ▪ Focus groups (face-to-face or phone) ▪ Measurement of physical demands ▪ Threshold Traits Analysis ▪ Ability Requirements Scales ▪ Position Analysis Questionnaire (PAQ) ▪ Critical Incident Technique ▪ Task inventory/CODAP ▪ Functional Job Analysis (FJA) ▪ Job Components Inventory (JCI) ▪ Task and Demands Analysis (AET) ▪ Job Elements Model 	<ul style="list-style-type: none"> ▪ Job Characteristics ▪ Vocational Rehabilitation ▪ Physical and Occupational Therapy ▪ Human Resources ▪ I/O Psychology ▪ Ergonomics ▪ Occupational Health ▪ Instructional Systems Design ▪ Education ▪ General Psychology ▪ Training of job analysts ▪ Training people that do data collection (e.g., test administrators, train the trainer) ▪ Effective training strategies/training best practices ▪ Training related to disability/physical

Exhibit 2-7	
Example Literature Review Topic Areas that Served as Keywords	
<ul style="list-style-type: none"> ▪ Fleishman Ability Requirements Scales ▪ Cognitive Task Analysis ▪ Competency Modeling ▪ Strong-Campbell Vocational Inventory (Holland's Taxonomy) ▪ Human Factors ▪ Task Analysis 	<ul style="list-style-type: none"> ability determinations ▪ Training of temporary employees ▪ Large-scale data collection considerations ▪ Comparing various training methods ▪ Certification of job analysts or similar ▪ Effective certification strategies/certification best practices

Because our team includes professionals from diverse fields, including vocational rehabilitation, exercise physiology, occupational therapy, and industrial/organizational psychology, we first solicited a list of the best job analysis sources from each of our team members. We then performed searches to locate book chapters, peer-reviewed journal articles and other materials using research-based search engines (e.g. EBSCO), online bibliographic resources, governmental resources, World Wide Web searches, and direct communications with the research and rehabilitation communities. Within each of these search mediums, we performed searches on general job analysis, specific data collection procedures (e.g., job observation), established job analysis models (e.g., Position Analysis Questionnaire), and job analysis in various disciplines.

Additionally, sources indicated as relevant taxonomies in the *OIDAP Content Model and Classification Recommendations* report were located and included in the literature review. The full text of all sources identified was gathered in electronic format or in hard copy when the electronic copies were not available. Exhibit 2-8 provides an overview of our initial analysis.

Exhibit 2-8	
Reviewed Taxonomies Originally Identified in the OIDAP Work Taxonomy and Classification Subcommittee Report	
Taxonomy	Reason for Inclusion or Exclusion
Common-Metric Questionnaire (CMQ)	<ul style="list-style-type: none"> ▪ The Common-Metric Questionnaire (CMQ) is a specific job analysis instrument that can be completed by job incumbents (Harvey, 1993). Although the CMQ can be completed by incumbents, this is not a requirement (e.g., a supervisor or analyst could complete the questionnaire instead of the incumbent). It was created to overcome limitations of previous job analysis instruments, specifically that previous instruments had too high of reading levels, presented behaviors that were too abstract, and did not adequately cover managerial jobs (Harvey, 1993). The CMQ includes 80 work dimensions which can be examined in a job analysis (Harvey, 1993). Items were created to be more behaviorally-specific than previous job analysis instruments (e.g., Position Analysis Questionnaire - PAQ, Job Element Inventory - JEI), but still allow for comparison across jobs (Harvey, 1993). ▪ The CMQ taxonomy follows the Functional Job Analysis theory that includes ratings of things, data, and people (Harvey, 2004). The CMQ is featured in Chapter 12.

Exhibit 2-8 (Continued) Reviewed Taxonomies Originally Identified in the OIDAP Work Taxonomy and Classification Subcommittee Report	
Taxonomy	Reason for Inclusion or Exclusion
General Work Inventory (GWI)	<ul style="list-style-type: none"> ■ The General Work Inventory (GWI) is another specific, structured job analysis instrument (Cunningham, Wimpee, & Ballentine, 1990). It is a shortened and less technical form of the Occupation Analysis Inventory (OAI) and includes both worker- and job-oriented items (Cunningham et al., 1990). The GWI was created as a questionnaire that military incumbents could complete in order to provide data to develop a taxonomy for describing and classifying jobs. ■ While the GWI may include a taxonomy that is useful in providing information for the actual job analysis instrument that SSA creates, it does not provide information useful to the development of a job analysis methodology. However, information on the GWI will be presented in the supplementary job analysis models chapter (see Chapter 21).
Job Element Inventory (JEI)	<ul style="list-style-type: none"> ■ The JEI is a worker-oriented job analysis questionnaire that is modeled after the Position Analysis Questionnaire (PAQ), with factors that closely match those in the PAQ (Harvey, Friedman, Hakel, & Cornelius, 1988). The JEI was created to be used in the U.S. Coast Guard by adapting items from the PAQ to be at a lower reading level (Cornelius, Hakel, & Sackett, 1979). This lower reading level ensures that most incumbents have the ability to complete the JEI. Analyses have shown that the JEI and the PAQ measure very similar dimensions of work behavior (Harvey et al., 1988). ■ The JEI has not received a great deal of empirical research, especially in recent years. As such, it will be included as a job analysis model in the supplementary job analysis models chapter (see Chapter 21).
Management Position Description Questionnaire (MPDQ)	<ul style="list-style-type: none"> ■ The Management Position Description Questionnaire (MPDQ) is a standardized job analysis questionnaire intended for individuals in management positions (Tornow & Pinto, 1976). It is a behavior-based measure that focuses on behaviors specific to management and executive positions. Responses to the questionnaire were used to create 13 different factors for management positions, which the authors suggest can be used in order to evaluate managerial jobs (Tornow & Pinto, 1976). ■ SSA requires a job analysis methodology that can be used with for the entire spectrum of skills levels for jobs in the U.S. (Social Security Administration, 2009). Because the MPDQ was developed specifically for executive and management positions, it is not well-suited to SSA's requirements. More information on the MPDQ is available in the supplementary job analysis models chapter (see Chapter 21).

Exhibit 2-8 (Continued) Reviewed Taxonomies Originally Identified in the OIDAP Work Taxonomy and Classification Subcommittee Report	
Taxonomy	Reason for Inclusion or Exclusion
Occupation Analysis Inventory (OAI)	<ul style="list-style-type: none"> ■ The Occupation Analysis Inventory (OAI) is a structured job analysis questionnaire that was developed with the goal of being an occupational exploration tool for individuals considering various jobs (Cunningham, Boese, Neeb, & Pass, 1983). When initially developed, applications for the OAI included curriculum development, test development, curriculum evaluation, occupational guidance and placement, and educational planning (Cunningham, Tuttle, Floyd, & Bates, 1974), however it was later used to create a taxonomy of work dimensions. The OAI was designed to include more technical content specific to jobs than the Position Analysis Questionnaire (PAQ), which was designed to be worker-oriented (Cunningham et al., 1983). ■ While the OAI was not specifically intended to be a job analysis model but rather a means for individuals to explore occupations, it has still been used to collect job-related information. Therefore, it will be included in the supplementary job analysis models chapter (see Chapter 21).
Occupational Aptitude Patterns Map (OAP Map)	<ul style="list-style-type: none"> ■ The Occupational Aptitude Patterns Map (OAP Map) was created to classify occupations (Gottfredson, 1986). It was created based on OAPs developed using information provided by the U.S. Employment Service (Gottfredson, 1986). The OAP Map specifies aptitudes that are required for various categories of occupations, but does not present a method for analyzing specific jobs. The OAP Map was not developed to be a job analysis tool; it was not used to define specific requirements of jobs, but rather to combine various occupations into groups with other similar occupations. ■ The clusters within the OAP Map do not provide information regarding tasks and skills required for specific jobs, but rather only contain major similarities and differences between jobs (Gottfredson, 1986). Because SSA requires a job analysis methodology that is able to describe jobs in terms of the required tasks (Social Security Administration, 2009), the OAP Map does not provide enough specificity to appropriate for SSA's needs and is therefore presented in the supplementary job analysis models chapter (see Chapter 21).

Exhibit 2-8 (Continued) Reviewed Taxonomies Originally Identified in the OIDAP Work Taxonomy and Classification Subcommittee Report	
Taxonomy	Reason for Inclusion or Exclusion
The Occupational Information Network (O*NET)	<ul style="list-style-type: none"> ■ The Occupational Information Network (O*NET) was developed in order to provide comprehensive information about a wide variety of jobs and workers across the U.S. (Peterson, Mumford, Borman, Jeanneret, Fleishman, Levin, et al., 2001). The O*NET content model includes information about worker characteristics and requirements, occupational requirements, experience requirements, and characteristics of the occupation. The data provided in O*NET are based on both analyst and job incumbent questionnaire ratings (Peterson et al., 2001). ■ O*NET follows a content model (Sanchez & Levine, 2001) that is often used as a source of background information when conducting job analyses. While this content model is not appropriate for SSA's purposes, the processes used to develop and conduct the large scale process of populating the O*NET database could inform SSA's job analysis efforts. As such, there is a chapter in the report that provides information regarding O*NET (see Chapter 17).
Position Analysis Questionnaire (PAQ)	<ul style="list-style-type: none"> ■ The Position Analysis Questionnaire (PAQ) is a job analysis model that is used to collect various types of worker-related information (McPhail, Jeanneret, McCormick, & Mecham, 2004). It is a widely researched and respected job analysis model (Sanchez & Levine, 2001). Additionally the PAQ has been the basis for the development of multiple other job analysis instruments (e.g., JEI, PMPQ). ■ The PAQ has been identified as an important job analysis model and is presented in Chapter 18.
Purdue Cognitive Task Analysis Questionnaire (PCTAQ)	<ul style="list-style-type: none"> ■ The Purdue Cognitive Task Analysis Questionnaire (PCTAQ) is a questionnaire that was developed to conduct Cognitive Task Analyses (Wei & Salvendy, 2000). This questionnaire was developed to analyze cognitive dimensions of jobs, such as mental planning and scheduling, learning, and memory. The PCTAQ is a questionnaire that can be used by job incumbents to self-report about their current jobs (Wei & Salvendy, 2000). ■ Because the PCTAQ is a specific questionnaire used for Cognitive Task Analyses and is not its own job analysis practice, it is included as part of the Cognitive Task Analysis chapter (see Chapter 13).

Exhibit 2-8 (Continued) Reviewed Taxonomies Originally Identified in the OIDAP Work Taxonomy and Classification Subcommittee Report	
Taxonomy	Reason for Inclusion or Exclusion
Professional and Managerial Position Questionnaire (PMPQ)	<ul style="list-style-type: none"> ■ The Professional and Managerial Position Questionnaire (PMPQ) is a job analysis system that was designed specifically for the study of professional and management positions (Mitchell, 1978). It was developed to overcome shortcomings of the Position Analysis Questionnaire (PAQ) as well as other existing job analysis instruments, specifically that they were not well-suited for analyzing higher-level positions (Harvey, 1993; Mitchell, 1978). In the development of the PMPQ, constructs relevant to professional or managerial jobs were identified (e.g., planning, information processing, communication) and representative items for each construct were selected. These items were administered to managerial job incumbents in order to choose the final items for the questionnaire (Mitchell & McCormick, 1979). ■ The PMPQ has not received a great deal of empirical support. It was originally developed in 1978 but there has not been published empirical work supporting the PMPQ since its creation. This lack of empirical support could be problematic in presenting the PMPQ as a well-supported job analysis practice. Additionally, the PMPQ cannot be used for all jobs; it is not suitable for analyzing non-managerial jobs (Harvey, 1993). Because SSA requires a job analysis method that can be used to capture jobs of all skill levels (Social Security Administration, 2009), the PMPQ cannot meet the needs of SSA and is included in the supplementary job analysis models chapter (see Chapter 21).
Worker Analysis Profile (WAP)	<ul style="list-style-type: none"> ■ The WAP is a job analysis instrument that is used to characterize worker-oriented job factors (McCormick, Cunningham, & Gordan, 1967). These worker-oriented variables can be used to characterize jobs of any type. The WAP was the first job analysis instrument to examine worker-oriented variables and their structure (McCormick et al., 1967). ■ The WAP has not received a great deal of recent empirical research and support. The WAP was created in 1967, does not appear to have been used in an empirical study since the 1970s. Due to the outdated nature of research regarding the WAP, it did not meet criteria for inclusion in the literature review chapters contained in this report. As such, it will be included in the supplementary job analysis models chapter (see Chapter 21).

Screen Job Analysis Sources

To maximize the quality and usefulness of each source entered into the literature review MS Access database, each literature source was reviewed by an ICF team member and evaluated for appropriateness to the current effort. Initially the evaluation of the literature sources occurred informally through the expert reasoning of the ICF team member. This process occurred until formal screening criteria had been defined and was useful in helping to define and refine the formal screening criteria listed in Exhibit 3-2.

Once these measures were developed, all sources were screened using the four criteria. If a literature source was evaluated as appropriate, it was entered into the database. For each source, ratings on each of the four criteria were made and documented in the MS Access database. For a source to pass evaluation and the source content to be fully entered into the database, it had to be rated in the top two options (e.g., “relevant” or “very relevant”) on all screening criteria. If a source was rated in either of the bottom options (e.g., “somewhat relevant” or “not at all relevant”) on any of the four criteria, the source was rejected. Initially literature sources that were rejected were not entered into the database at all; however, at the request of SSA for a complete capture of all the literature reviewed, the rejected literature sources, but not their content, were entered into the database along with their ratings on the screening criteria. The screening of two articles can found in Exhibit 2-9 as an example of this process.

Exhibit 2-9 Literature Review Screening Example	
<p>Rodgers, S. H. (1992). A functional job analysis technique. <i>Occupational Medicine</i>, 7(4), 679-711.</p> <p>Screening Ratings:</p> <ul style="list-style-type: none"> ▪ Relevant ▪ Adequate methodological detail ▪ Peer-reviewed source ▪ Information is outdated but still useful 	<p>Shippmann, J. S., Ash, R. A., Battista, M., Carr, L., Eyde, L. D., Hesketh, B., Kehoe, J., Pearlman, K., Prien, E. P., & Sanchez, J. I. (2000). The practice of competency modeling. <i>Personnel Psychology</i>, 53(3), 703-740.</p> <p>Screening Ratings:</p> <ul style="list-style-type: none"> ▪ Relevant ▪ Some methodological detail ▪ Peer-reviewed source ▪ Information is current
<p>Result: RETAINED</p> <p><i>Note: This source was retained because it was rated in the top two options on all screening criteria.</i></p>	<p>Result: REJECTED</p> <p><i>Note: This source was rejected because it was rated as having “some methodological detail”, which falls in the bottom two options of the “Level of Detail” criterion.</i></p>

All articles that passed the screening criteria were fully analyzed and entered into the database. This screening process allowed for identification and inclusion of the relevant quality articles that provided a sufficient level of detail on job analysis various practices. The bar for the screening criteria were set relatively low to aid the project team in eliminating literature sources that were low quality or did not provide enough relevant detail to be useful in our analyses. This process allowed the project team to capture the best and most useful articles on all job analysis practices, ensuring that no mainstream or established job analysis practice was ignored. As long as one source about a specific job analysis practice passed the base-level criteria, that one source was fully included in the literature review database and the practice is included in this final report. Job analysis practices with sufficient published empirical support are described in a full results chapter in this final report (see Section 2 and Section 3), while practices that did not have sufficient published empirical support and/or were not suited to SSA’s OIS needs are summarized briefly in a supplemental chapter (see Chapter 10 or Chapter 21). Additionally, the project team went back to the literature, including articles that may have been screened out for full inclusion in the literature review database, to help supplement results chapters as necessary.

Train Data Entry Team and Enter Literature Findings

Once the final set of ‘retained’ job analysis articles was identified, the literature review team was trained on the framework for describing job analysis practices and the functionality of the Literature Review database. This training had two overarching goals: 1) ensure the team understood each of the framework categories and options listed in the literature review database, and 2) ensure the team understood and felt comfortable using the MS Access form to enter source information. The content of the training, which includes definitions of all framework categories and options, can be found in Appendix C.

To establish inter-rater reliability and consistency, each team member independently reviewed and fully entered two job analysis sources into his/her own practice database after the initial literature review training session. The sources used as training entries were selected to provide a variety of discipline, article type, and level of detail provided. All entries were compared and discrepancies between entries on the same article were used as the basis for further discussion and refinement of the framework definitions. This process allowed each literature review team member to adequately understand each framework category and option and agree on the information that should be entered in order to maximize consistency in source entries across team members.

After each team member was sufficiently trained on the framework and MS Access database and the training articles were completed, the final set of sources for full entry were split up and assigned to team members. Each team member fully entered each source according to the framework categories and options outlined in Appendices A and C.

When analyzing the data contained in the literature review, MS Access reports were run for each data collection procedure and each job analysis established model. Each report contained information for each database framework category for each source entered on the focal procedure or model. This allowed the project team to efficiently review the information uncovered in the literature review in order to draft comprehensive and accurate job analysis results chapters for this report. When drafting the results chapters, a project team member reviewed the information presented in the report for a specific category (e.g., type of data collected) for each source included in the literature review. For rating categories (e.g., security of data), an average was taken across ratings to determine the final rating included in the results chapter. When discrepancies between articles occurred, the project team member used his/her expert judgment to synthesize and present the most typical rating or information. For significant variation in ratings, explanation is given in the descriptions for the specified category presenting the circumstances that provide a different level than indicated.

Subtask 2.3—Documentation for SSA – Literature Reviews and Expert Interviews

To ensure SSA has documentation of all sources of information that were gathered and used in the completion of Call Order 0001, we provided SSA with the complete job analysis literature review database and notes from all qualitative data collections (i.e., focus groups). The job analysis literature review database is an Access database. It contains every literature source that we found and screened during our literature review. Within the database, each literature source was entered as a separate entry in the database and coded on four screening questions: relevancy, level of detail, publishing source, and whether the source is current (i.e., 2000 and later). Each screening question utilized a four-point Likert-type rating scale. These four screening questions comprised the criteria for whether a literature source was included for analysis. If a literature source was rated at the two lower rating points of the scale on any one of the four screening questions, that literature source was not included for analysis. For those literature sources that were included for analysis, additional information from the literature source was entered into the job analysis literature review database. It is important to note that the job analysis literature review database was for documentation purposes only and was provided to SSA “as is,” meaning the database was not created as a polished deliverable suitable for use in the public domain or for use in future assessment of the same literature.

Notes from all of the qualitative data collections conducted during the course Call Order 0001 were documented and provided to SSA by protocol question and presented in a Microsoft Word document. The notes were not verbatim transcripts but instead provided an overall summary of what was said by the participant(s). In addition, we provided all recordings of the focus groups to SSA for their records. The recordings of the focus groups were purchased from our conference calling service and were provided as mp3 files on CDs.

Chapter 3: Job Analysis Practice Review Results Introduction

In the following subsections, we provide detail regarding the structure and content of the remaining chapters in this report, and we provide an overview of the expert evaluation activity.

Subtask 3.1—Develop Call 0001 Results Template

The ultimate goal of this effort was to summarize the wealth of job analytic procedure information available across disciplines in a manner that will allow SSA decision makers to quickly understand and evaluate various job analysis practices. To achieve this objective, the ICF team analyzed results from all Call 0001 data collections (i.e., literature review and focus groups). Each major job analysis model and procedure was then summarized in a separate chapter and followed the standard reporting template presented below. Using this standard template ensures that information is comparable across the various models and procedures so that SSA decision makers have the analogous information about each practice. This will facilitate comparisons and decisions made between different practices. To ensure consistency in terminology, we use the following nomenclature throughout our results:

- **Project Method(ology)** – The steps taken to conduct this research for this call order
- **Job Analysis Method(ology)** – Refers to ultimate SSA job data collection process developed to address OIS needs
- **Practice** – Refers to all job analysis approaches, models and procedures, identified through this call order
- **Model** – Refers to an established, ‘off-the-shelf’ job analysis approach identified through this call order
- **Procedure** – Refers to a data collection technique identified through this call order

Each of the practices provided in Exhibit 3-1 is summarized and evaluated in a separate chapter of this final report.

Exhibit 3-1	
Major Job Analysis Practices Summarized in this Final Report	
<ul style="list-style-type: none"> ▪ AET ▪ Common-Metric Questionnaire ▪ Cognitive Task Analysis ▪ Fleishman Ability Requirement Scales ▪ Functional Job Analysis ▪ Job Element Model ▪ O*NET ▪ Position Analysis Questionnaire 	<ul style="list-style-type: none"> ▪ Task Inventory ▪ Review of Written Materials ▪ Job Observation ▪ Survey ▪ Interview ▪ Focus Group ▪ Instrument Measurement of Physical Demands

This report also includes two Supplementary Practices Chapters; one comprising supplementary procedures and the other comprising the supplementary procedures. These Supplementary Practices Chapters provide a synopsis of job analysis practices that were included in our review but deemed unsuitable for SSA’s ultimate goals. While these overall practices were determined to be unsuitable for SSA’s needs, the practices contained in the supplementary chapter may include constructs that could be used in the development of SSA’s taxonomy. These supplemental chapters were incorporated to document all the practices considered during Call 0001.

In the remainder of this chapter, we present an overview of the standard reporting template that will be used to shape each major results chapter. The overview includes all related category definitions. We describe and define the results template here to give stakeholders a comprehensive understanding of the information that will be included.

Overview of Results Template

Exhibits 3-2 through 3-10 define each section and the specific categories used within the results template. Within each exhibit, the data field names are provided for the entire template section and then defined. As described, results chapters will follow this format to provide findings from all Call 0001 data collection as they pertain to each major job analysis model and procedure identified.

Exhibit 3-2 presents the information that comprises the first section of the results template. The first section is an overview of the specific job analysis practice. This exhibit gives basic information about the practice and is meant to provide background knowledge about and give a quick overview of the practice.

Exhibit 3-2 Call 0001 Results Template Section 1 – Overview of Subject Job Analysis Practice	
Data Field Name	Description
Job Analysis Practice Title	<ul style="list-style-type: none"> Short descriptive label for subject job analysis practice described in chapter.
Practice Highlights	<ul style="list-style-type: none"> Bulleted overview of key points of interest from full analysis of practice.
Description	<ul style="list-style-type: none"> Provides detailed, written overview of subject job analysis practice.
Disciplines that Use Practice	<ul style="list-style-type: none"> Visually indicates the disciplines that utilize subject job analysis practice.

The second section of the results template includes information about the quality of data collected using the subject job analysis practice as well as information about the collected data that should be considered in evaluating each job analysis practice. Definitions of the categories presented in this section can be seen in Exhibit 3-3.

Exhibit 3-3 Call 0001 Results Template Section 2 – Quality and Data Considerations	
Data Field Name	Description
Level of Detail in Data Collected	<p>Level of detail in data collected refers to the specificity of the information collected using the subject job analysis practice. Rating scale anchors correspond to the following definitions:</p> <ul style="list-style-type: none"> General – Description of job at high level; broad Moderate – Major work activities (e.g., if analyst goes out and asks incumbent about the activity, then it could be moderate), capturing specific information, such as worker functions, tasks, KSAs. Precise – Provides numerical representations, exact tasks description, and/or precise facts related to job or incumbent

Exhibit 3-3 (Continued) Call 0001 Results Template Section 2 – Quality and Data Considerations	
Level of Job Performance Measured	<p>Level of job performance refers to the performance level of employees captured by the subject job analysis practice. Rating scale anchors correspond to the following definitions:</p> <ul style="list-style-type: none"> ▪ Minimal – Describes the minimal level of performance (i.e., below average, generally considered unsatisfactory). ▪ Average – Describes the average level of performance (i.e., typical and expected) ▪ Maximal – Describes the maximum level of performance (i.e., above and beyond, exceeds expectations and quality of work)
Security of Data	<p>Security of data ratings concern the security of the practices used to store and/or transmit collected data. Rating scale anchors correspond to the following definitions:</p> <ul style="list-style-type: none"> ▪ Low – Physical transmission of data (e.g., hard mail). ▪ Moderate – Manual entry of data from notes into secure digital medium (e.g., data entered through web portal). ▪ High – Direct entry of data into a secure (i.e., controlled) digital medium (e.g., PDA device).
Validity of Data	<p>Validity of the data refers to the quality of or lack of error in the data collected using the subject job analysis practice. Rating scale anchors correspond to the following definitions:</p> <ul style="list-style-type: none"> ▪ Low – Many opportunities for error, judgment to be introduced (e.g., job observations). Almost no anchors or rating scales. ▪ Moderate – Few opportunities for error, judgment to be introduced (e.g., surveys, interviews). ▪ High – Almost no opportunities for error, judgment to be introduced (e.g., measuring weight of physical objects).

Exhibit 3-3 (Continued) Call 0001 Results Template Section 2 – Quality and Data Considerations	
Reliability of Data/ Standardization of Procedures	<p>Reliability of the data ratings pertain to the standardization of data collection administrations. Rating scale anchors correspond to the following definitions:</p> <ul style="list-style-type: none"> ▪ Low Standardization – Complete flexibility/ adaptability (e.g., reviewing position descriptions without scale or informal job observations). ▪ Moderate Standardization – Moderate flexibility/adaptability (e.g., skip patterns in web survey). Most incumbents get the same experience with some variations. ▪ Complete Standardization – Exact replication in every administration (e.g., paper survey).
Ease of Data Aggregation	<p>Ease of data aggregation concerns the difficulty in combining ratings from multiple job analysis administrations. Rating scale anchors correspond to the following definitions:</p> <ul style="list-style-type: none"> ▪ Easy – Numerical data are averaged and mean is used as result (e.g., measuring weight of physical objects). ▪ Moderate – Data are cleaned, averaged, then formula is applied (e.g., data resulting from Likert scales). ▪ Difficult – Data must be sorted, coded, and/or manually combined (e.g., qualitative interview data resulting in lists of tasks).

Exhibit 3-4 presents information about Section 3 of the results template, which includes the source(s) used to gather data within the subject job analysis practice. Each practice uses one or more sources in order to collect job analysis data. Data sources could include job incumbents, direct supervisors, executive leadership, customers or clients, human resource professionals, written organizational materials, or other data sources.

Exhibit 3-4 Call 0001 Results Template Section 3 – Data Source(s)	
Data Field Name	Description
Data Source(s)	<ul style="list-style-type: none"> ▪ Identifies the key person(s) from whom job relevant information is gathered. Data may also be gathered from previously written materials in addition to people.

The next section of the report provides information regarding the data collection procedure(s) that can be used for the specific job analysis practice. One or more data collection procedures are used to collect the necessary information during the job analysis. Possible data collection procedures include reviewing written materials, job observation, surveys, interviews, focus groups, and measuring physical demands. If a job analysis practice uses a unique procedure that is not common across job analysis procedures, it will

be recorded as “other practices” and listed in the template. A definition of this section of the results template is given in Exhibit 3-5.

Exhibit 3-5 Call 0001 Results Template Section 4 - Target Data Collection Procedure(s)	
Data Field Name	Description
Data Collection Procedure(s)	<ul style="list-style-type: none"> ▪ Provides a visual representation of the various procedures that can be used to collect job analysis information using the subject job analysis practice.

Exhibit 3-6 provides information regarding the type of data that are collected using the subject job analysis practice. This exhibit lists and describes all of the possible data types that can be gathered using the job analysis practices. However, each chapter will list only the data types relevant to the specific job analysis practice in the chapter and the other approaches will not appear.

Exhibit 3-6 Call 0001 Results Template Section 5 – Type of Data Collected	
Data Field Name	Description
Type of Data Collected	<p>This provides information about the specific types of data that are typically collected using the specific job analysis practice. The following are possible categories for types of data:</p> <ul style="list-style-type: none"> ▪ Task Descriptions – Work activities ▪ Knowledge, Skills, and Abilities – Worker attributes, not learned ▪ Cognitive Demands – Aspects of the job that put demands on the mind ▪ Environmental Conditions – Conditions experienced in the workplace ▪ Worker Functions – Ratings of worker functions ▪ Physical Demands – Required physical activities ▪ Personality Characteristics – Personality, attitudes, interests, and values
Type of Data Collected (Continued)	<ul style="list-style-type: none"> ▪ Training and Education Requirements – Qualifications necessary to perform the job ▪ Minimum Entry Qualifications – Absolute minimum to perform the job ▪ Tools, Equipment, and Work Aids – What is used on the job ▪ Importance/Frequency of Activities/ Characteristics ▪ Other Data Collected

Section 6 of the results template includes information about the resources that are needed in order to conduct the subject job analysis practice. This includes tools to document data as well as time and monetary considerations. Definitions of each of the categories in this section are presented in Exhibit 3-7.

Exhibit 3-7	
Call 0001 Results Template Section 6 – Resources Needed	
Data Field Name	Description
Length of Time to Develop	Length of time to develop refers to the amount of time needed to prepare or create all details for the subject job analysis practice. Rating scale anchors correspond to the following definitions: <ul style="list-style-type: none"> ▪ Short – Less than 1 month. ▪ Medium – 1 to 6 months. ▪ Long – 6 months or longer.
Monetary Cost to Develop	Monetary cost to develop concerns the cost required to create the job analysis practice, but does not include labor costs. Rating scale anchors correspond to the following definitions: <ul style="list-style-type: none"> ▪ Inexpensive ▪ Moderate ▪ Expensive
Length of Time to Administer	Length of time to administer refers to the actual amount time spent gathering data using the specific job analysis practice. Rating scale anchors correspond to the following definitions: <ul style="list-style-type: none"> ▪ Short – Less than 2 hours. ▪ Medium – 2 hours to 5 hours. ▪ Long – 5 hours or longer.
Monetary Cost to Administer	Monetary cost to administer refers to any costs incurred when collecting data, excluding labor costs. Rating scale anchors correspond to the following definitions: <ul style="list-style-type: none"> ▪ Inexpensive ▪ Moderate ▪ Expensive
Data Documenting Resource(s)	<ul style="list-style-type: none"> ▪ Identifies each of the tools used during data collection, how each is used, and what the tools measure.
Additional Resource(s) Needed	<ul style="list-style-type: none"> ▪ Identifies resources that are necessary in order to collect data using the subject job analysis practice.

During the literature review and expert evaluations, information pertaining to the legal defensibility of the subject job analysis practice was gathered in order to help evaluate each practice in regards to this SSA's need for a legally defensible job analysis practice. Exhibit 3-8 provides the legal defensibility section of the results template.

Exhibit 3-8	
Call 0001 Results Template Section 7 – Legal Defensibility	
Data Field Name	Description
Legal Defensibility	<ul style="list-style-type: none"> ▪ Identifies information pertaining to the legal defensibility and related information of the subject job analysis practice.

Exhibit 3-9 presents the information that is reported in Section 8 of the results template. This section includes both positive and negative aspects of the subject job analysis practice.

Exhibit 3-9 Call 0001 Results Template Section 8 – Pros/Cons	
Data Field Name	Description
Positive Aspects of Practice	<ul style="list-style-type: none"> ▪ Provides a bulleted list of potential positive features associated with the subject job analysis practice.
Negative Aspects of Practice	<ul style="list-style-type: none"> ▪ Provides a bulleted list of potential negative or challenging features associated with the subject job analysis practice.

The final section of each chapter includes a summary of the expert evaluation results for that job analysis practice. A description of the expert evaluation activity, as well as the evaluation criteria presented in each of the results chapters, is described in the next section, Subtask 3-2.

It should also be noted that in the process of developing the remaining chapters for each major job analysis practice, additional articles were identified as being relevant for inclusion in the literature review. These additional articles were located, retrieved, and included in the pertinent chapters. One staff member was assigned to enter the additional articles into the literature review database following the same process as used for the earlier data entry.

Subtask 3.2—Evaluation of Major Job Analysis Practices

As indicated above, a panel of job analysis experts systematically evaluated each of the major job analysis models and procedures presented in the remaining chapters. In preparation for the expert evaluations, we conducted the following activities:

- Developing the evaluation criteria, anchors, and associated definitions
- Choosing and training evaluators on criteria
- Combining and analyzing expert evaluation ratings
- Comparing Major Job Analysis Practices Evaluated

We provide a description of each activity below. Ultimately, the evaluation process allowed our team to identify the most appropriate data collection practice(s) available and make related recommendations.

Developing the Evaluation Criteria, Anchors, and Associated Definitions

To begin, a comprehensive set of evaluation criterion questions was developed. To create these evaluation questions, the report entitled *Social Security Administration's Legal, Program, and Technical/Data Occupational Information Requirements*, which details the requirements that must be met for the development of SSA's new OIS, was reviewed. This allowed our team to incorporate previously defined SSA requirements into our evaluation criteria, which will help to ensure that identified job analysis practices can meet the needs of SSA. The final evaluation items included:

- Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data
- Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection

- Likelihood Practice will Be Credible Among Job Analysis Experts
- Likelihood Analysts Could Be Successfully Trained to Use Practice
- Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees
- Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy.
- Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System
- Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation
- Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)
- Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)

Once the criterion questions were finalized, we documented detailed definitions of each criterion to ensure that all evaluators could fully understand the information being measured. This process was used to help ensure reliable and valid ratings across experts. An example ratings sheet that lists the evaluation criteria and definitions can be found in Exhibit 3-10.

Exhibit 3-10 Expert Evaluation Criteria Definitions	
Criterion	Definition
<p>1. Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <p><input type="radio"/> Very Unlikely (i.e. less than 25% chance)</p> <p><input type="radio"/> Somewhat Unlikely (i.e. 25 to 50% chance)</p> <p><input type="radio"/> Somewhat Likely (i.e. 50 to 75% chance)</p> <p><input type="radio"/> Very Likely (i.e. more 75% chance)</p>	<ul style="list-style-type: none"> ▪ This item is asking expert evaluators to determine the probability of the practice producing valid data during one administration as well as the practice's ability to collect data that can be observed and measured.
[Include any relevant notes/description]	<ul style="list-style-type: none"> ▪ Bullet reasons practice might or might not produce valid, measurable, or verifiable data
<p>2. Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <p><input type="radio"/> Very Unlikely (i.e. less than 25% chance)</p> <p><input type="radio"/> Somewhat Unlikely (i.e. 25 to 50% chance)</p> <p><input type="radio"/> Somewhat Likely (i.e. 50 to 75% chance)</p> <p><input type="radio"/> Very Likely (i.e. more 75% chance)</p>	<ul style="list-style-type: none"> ▪ This item is asking expert evaluators to determine the probability of the practice producing reliable data across administrations in separate geographic locations across the country.
[Include any relevant notes/description]	<ul style="list-style-type: none"> ▪ Bullet reasons practice might or might not produce reliable data

Exhibit 3-10 (Continued) Expert Evaluation Criteria Definitions	
<p>3. Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely (i.e. less than 25% chance) <input type="radio"/> Somewhat Unlikely (i.e. 25 to 50% chance) <input type="radio"/> Somewhat Likely (i.e. 50 to 75% chance) <input type="radio"/> Very Likely (i.e. more 75% chance) 	<ul style="list-style-type: none"> ▪ This item is asking expert evaluators to determine the probability of the practice being viewed as scientifically worthy and appropriate among a wide spectrum job analysis experts.
[Include any relevant notes/description]	<ul style="list-style-type: none"> ▪ Bullet reasons practice might or might not be seen as worthy or appropriate by stakeholders
<p>4. Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely (i.e. less than 25% chance) <input type="radio"/> Somewhat Unlikely (i.e. 25 to 50% chance) <input type="radio"/> Somewhat Likely (i.e. 50 to 75% chance) <input type="radio"/> Very Likely (i.e. more 75% chance) 	<ul style="list-style-type: none"> ▪ This item is asking expert evaluators to determine the probability of the practice being fully learned by competent analysts if a complimentary, single-administration training was developed.
[Include any relevant notes/description]	<ul style="list-style-type: none"> ▪ Bullet reasons practice might or might not be fully learned through a complimentary, single-administration training.
<p>5. Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely (i.e. less than 25% chance) <input type="radio"/> Somewhat Unlikely (i.e. 25 to 50% chance) <input type="radio"/> Somewhat Likely (i.e. 50 to 75% chance) <input type="radio"/> Very Likely (i.e. more 75% chance) 	<ul style="list-style-type: none"> ▪ This item is asking expert evaluators to determine the probability of the practice ensuring confidentiality for host employers if administered properly.
[Include any relevant notes/description]	<ul style="list-style-type: none"> ▪ Bullet reasons practice might or might not ensure confidentiality
<p>6. Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy.</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely (i.e. less than 25% chance) <input type="radio"/> Somewhat Unlikely (i.e. 25 to 50% chance) <input type="radio"/> Somewhat Likely (i.e. 50 to 75% chance) <input type="radio"/> Very Likely (i.e. more 75% chance) 	<ul style="list-style-type: none"> ▪ This item is asking expert evaluators to determine the probability of an organization wanting to invest the time and/or monetary resources necessary to successfully implement this practice nationally.
[Include any relevant notes/description]	<ul style="list-style-type: none"> ▪ Bullet reasons practice might or might not want to invest the time and/or monetary resources necessary to implement this practice nationally.

Exhibit 3-10 (Continued) Expert Evaluation Criteria Definitions	
<p>7. Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely (i.e. less than 25% chance) <input type="radio"/> Somewhat Unlikely (i.e. 25 to 50% chance) <input type="radio"/> Somewhat Likely (i.e. 50 to 75% chance) <input type="radio"/> Very Likely (i.e. more 75% chance) 	<ul style="list-style-type: none"> ▪ This item is asking expert evaluators to determine the probability of the practice's ability to collect data on all occupations that are included in the SOC system.
<p>[Include any relevant notes/description]</p>	<ul style="list-style-type: none"> ▪ Bullet reasons practice might or might not be able to collect data regarding all jobs in the country represented in the SOC system.
<p>8. Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely (i.e. less than 25% chance) <input type="radio"/> Somewhat Unlikely (i.e. 25 to 50% chance) <input type="radio"/> Somewhat Likely (i.e. 50 to 75% chance) <input type="radio"/> Very Likely (i.e. more 75% chance) 	<ul style="list-style-type: none"> ▪ This item is asking expert evaluators to determine the probability of the practice being able to collect data detailed enough to uniquely describe individual jobs.
<p>[Include any relevant notes/description]</p>	<ul style="list-style-type: none"> ▪ Bullet reasons this practice might or might not collect data that are at the necessary level of specificity.
<p>9. Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely (i.e. less than 25% chance) <input type="radio"/> Somewhat Unlikely (i.e. 25 to 50% chance) <input type="radio"/> Somewhat Likely (i.e. 50 to 75% chance) <input type="radio"/> Very Likely (i.e. more 75% chance) 	<ul style="list-style-type: none"> ▪ This item is asking expert evaluators to determine the probability of the practice describing the work activities and demands that are required for each occupation.
<p>Include any relevant notes/description]</p>	<ul style="list-style-type: none"> ▪ Bullet reasons this practice might or might not be able to collect the necessary work activities and job-side information.

Exhibit 3-10 (Continued) Expert Evaluation Criteria Definitions	
<p>10. Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely (i.e. less than 25% chance) <input type="radio"/> Somewhat Unlikely (i.e. 25 to 50% chance) <input type="radio"/> Somewhat Likely (i.e. 50 to 75% chance) <input type="radio"/> Very Likely (i.e. more 75% chance) 	<ul style="list-style-type: none"> ▪ This item is asking expert evaluators to determine the probability of the practice describing the personal attributes and KSA that are necessary for each occupation.
<p>[Include any relevant notes/description]</p>	<ul style="list-style-type: none"> ▪ Bullet reasons the practice might or might not be able to define the minimum KSAs necessary for occupations.

Choosing and Training Evaluators on Criteria

Eight experts, from a variety of related disciplines, were chosen to participate in our evaluation of job analysis practices. Exhibit 3-11 provides a list of the panel members and a summary of their experience. Each evaluator attended a comprehensive training session discussing the evaluation process and evaluation criteria definitions. Examples were provided and questions were answered to ensure that all evaluators understood the criteria and felt comfortable making ratings across criteria.

Once evaluators were trained, each person read the summaries of each job evaluation practice and data collection procedures and manually made ratings on the rating sheet for each of the criteria. For each criterion, space was provided for the expert to provide commentary, suggestions, or reasons for their rating. Evaluators had the opportunity to read and make ratings at their convenience over a 1-week period.

Combining and Analyzing Expert Evaluation Ratings

Once all evaluators completed their ratings, the data were entered into an Excel spreadsheet. All data were checked for quality entries, and means and standard deviations were computed to determine the average and variance of ratings on each of the criteria and overall for each practice/procedure.

After mean and variance were computed, evaluators attended a group meeting to discuss ratings with higher levels of variance. This meeting was used to clear up any potential confusion with the rating criteria or any intricacies with job analysis practices or procedures. In this meeting, evaluators discussed the reasons for their ratings and had the opportunity to make revisions. Final ratings were recorded in the corresponding practice results templates provided in this report, while a summary of the expert results ratings across the job analysis practices is presented in the final chapter.

**Exhibit 3-11
Expert Panel Members**

Name	Degree and Field	Years of JA Experience	Job Title	Disciplines worked in
Lance Anderson	Ph.D., Industrial/ Organizational Psychology	22 years	Vice President	Industrial/Organizational Psychology
Allison Cook	M.S., Industrial/ Organizational Psychology	3 years	Associate	Industrial/Organizational Psychology, Human Resources
Brian Cronin	Ph.D., Industrial/ Organizational Psychology	10 years	Senior Manager	Human Resources, Industrial/ Organizational Psychology
Paul Davis	Ph.D., Exercise Science	36 years	President, First Responder Institute	Ergonomics, Human Factors, Environmental Physiology, Occupational Health, Rehabilitative Medicine (Cardiac Rehab)
Kelly Chapman-Day	Ph.D., Occupational Therapy	8 years	Clinical Specialist – FCE Program Manager	Ergonomics, Occupational Therapy, Vocational Rehabilitation
Beth Heinen	Ph.D., Industrial/ Organizational Psychology	5 years	Senior Associate	Industrial/Organizational Psychology
Jessica Jenkins	M.Phil, Industrial/ Organizational Psychology	5 years	Senior Associate	Industrial/Organizational Psychology, Human Resources
Leonard Matheson	Ph.D., Psychology	35 years	Psychologist, Vocational Evaluator, Rehabilitation Counselor	I/O Psychology, Vocational Rehabilitation, Ergonomics

SECTION 2: Data Collection Procedure Results Chapters

Section 2 provides descriptions of each general job analysis data collection procedure and is comprised of the following seven chapters:

Chapter 4: Review of Written Materials

Chapter 5: Job Observation

Chapter 6: Survey

Chapter 7: Structured Interviews

Chapter 8: Focus Groups

Chapter 9: Instrument Measurement of Physical Demands

Chapter 10: Supplementary Job Analysis Data Collection Procedures

The first six chapters in Section 2 provide detailed information about each of the six main data collection procedures used to collect job analysis data. Within each chapter, a general description of the data collection procedure is provided along with the disciplines that used the practice (e.g., I/O Psychology), quality and data considerations (e.g., reliability/standardization), source(s) of data (e.g., incumbents), type of data collected (e.g., KSAs), resources needed (e.g., time and money to develop), legal defensibility, pros/cons, and expert evaluation results. Chapter 10 provides brief summaries of data collection procedures that do not have sufficient published empirical support and/or are not suited to SSA's OIS needs.

Chapter 4: Review of Written Materials

This chapter provides a summary of Review of Written Materials (RWM) as a job analysis data collection procedure. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. This chapter summarizes RWM as a general data collection procedure that can be used alone or in combination with other data collection procedures in conducting successful job analyses.

Exhibit 4-1 Review of Written Materials: Practice Description and Results

The Review of Written Materials (RWM) is an essential starting point and foundation for almost all job analysis practices including previously described job analysis models such as the Position Analysis Questionnaire (PAQ), Task Inventory, Threshold Traits Analysis (TTA), AET, and Cognitive Task Analysis (CTA) as well as customized job analysis practices developed for specific organizational purposes (Gael, 1988; U.S. Department of Labor 1991; OHCOW, n.d.; Ohio Department of Administrative Services, 2006; Peterson, Mumford, Borman, Jeanneret, Fleishman, Campion et. al., 2001). RWM is the process of analyzing job-related documents and reports to gain a broader and more detailed understanding of the job. These source documents might include a wide variety of materials such as, but not limited to, recruitment brochures, minimum requirements for employment; previous job analysis results, job descriptions, training materials, organizational charts, performance reviews, job aids, daily logs, equipment descriptions, and standard operating procedures (Biddle, 2009; Brannick & Levine, 2002; Brannick, Levine, & Morgeson, 2007; Clifford, 2001; Jones, Main, Butler, & Johnson 1982).

Job Analysis Practice Highlights

- ▶ Review of Written Materials serves as the starting point of most job analysis models and procedures
- ▶ Process of analyzing job-related documents and reports to gain a broader and more detailed understanding of the job.
- ▶ When combined with additional data collection techniques, RWM is a legally defensible job analysis practice.
- ▶ Collects data related to Tasks Descriptions, Knowledges, Skills, & Abilities, and Physical Demands associated with the job as well as other occupational requirements
- ▶ Used across all job analysis disciplines.

While conducting RWM, it is prudent for job analysts to take structured notes related to the tasks, knowledges, skills, abilities, and physical demands associated with the job as well as other occupational requirements (Crandall, Klein, & Hoffman, 2006; Gael, 1988; Gael, 1990). It is also critical to catalogue all materials reviewed or future reference. Through this process, analysts are able to become more familiar with the target job. Knowledge gained can be used to inform subsequent data collection techniques; to refine the questions asked in interviews, focus groups, and surveys; and/or to begin the process of completing structured work analysis instruments.



Discipline(s)					
 Physical and Occupational Therapy <input checked="" type="radio"/> Yes <input type="radio"/> No	Occupational Health <input checked="" type="radio"/> Yes <input type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input checked="" type="radio"/> Yes <input type="radio"/> No	Human Resources <input checked="" type="radio"/> Yes <input type="radio"/> No	 Ergonomics <input checked="" type="radio"/> Yes <input type="radio"/> No

Exhibit 4-1 (Continued)
Review of Written Materials: Practice Description and Results

Quality & Data Considerations

<p align="center">Level of Detail in Data Collected</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> General <input type="radio"/> Moderate <input type="radio"/> Precise <p>The quality of available source documents will directly impact the level of detail in data collected. In many instances, job analysts only received a general overview of the job when reviewing organizational materials (Gael, 1988; Keyserling, Armstrong, Punnett, 1991). For this reason, RWM is almost always complemented by additional techniques.</p>	<p align="center">Level of Job Performance Measured</p> <ul style="list-style-type: none"> <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal <p>Analysts are often aggregating information from diverse sources during RWM (minimum requirements, production targets, promotion standards). Thus, using RWM alone, it is difficult to determine the specific level of performance associated with a particular job. In most cases, the analyst gains a general understanding of the job through RWM that must be refined through additional data collection (Brannick & Levine, 2002; Brannick et al. 2007).</p>	<p align="center">Security of Data</p> <ul style="list-style-type: none"> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High <p>Data security is an important issue during RWM since many of the documents examined by the analyst may be proprietary and sensitive in nature. For this reason, it is essential for files to be transferred securely and for the analyst to be cautious in his/her review of source materials. When training procedures are followed correctly, security of data is at least moderate under non-extenuating conditions.</p>
<p align="center">Validity of Data</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Low <input type="radio"/> Moderate <input type="radio"/> High <p>Validity of data depends largely on the judgment of the analyst as well as on the soundness of source documents reviewed. Typically the process produces useful information but the data are often incomplete and must be verified or bolstered through additional data collection (Crandall et al., 2006; Gael, 1988; Gael, 1990).</p>	<p align="center">Reliability of Data/ Standardization of Procedures</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Low <input type="radio"/> Moderate <input type="radio"/> Complete <p>RWM has low reliability because the quality and amount of existing job materials will vary from job to job. Analysts must be trained to work within the parameters of available sources.</p>	<p align="center">Ease of Data Aggregation</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Difficult <input type="radio"/> Moderate <input type="radio"/> Easy <p>Data aggregation can be difficult in RWM since the materials analyzed will not be provided in a standard format. Thus, the analyst must aggregate data from different contexts in order to identify, assess and organize the job data uncovered in a manner that will be useful in subsequent job analysis phases (McPhail et al., 2004).</p>





Exhibit 4-1 (Continued) Review of Written Materials: Practice Description and Results					
 Data Source(s) 					
<p style="text-align: center;">Organizational Materials</p> <p>Organization-level files, such as recruitment brochures, minimum requirements for employment; previous job analysis results, job descriptions, training materials, organizational charts, performance reviews, job aids, daily logs, equipment descriptions, and standard operating procedures, are reviewed by a job analyst to get an overview of the job and potentially some needed job analysis data (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Jones et al., 1982). These documents can be provided by Human Resource professionals, incumbents, or supervisors.</p>	<p style="text-align: center;">Internet</p> <p>On-line occupational description resources such as O*NET provide a wealth of information about existing jobs (Peterson et al, 2001). In addition, WebCrawler searches are often able to produce previous job analysis reports and position descriptions from related jobs in other organizations. These documents, while not from the target organization, may be valuable in identifying major job activities.</p>				
<p style="text-align: center;">Local, State and Federal Regulations</p> <p>In certain jobs, legislated guidelines describe the procedures and standards that must be upheld for job tasks to be completed successfully. The written laws associated with these regulations are useful sources of information when completing a RWM.</p>	<p style="text-align: center;">Training Programs and Certification Exams</p> <p>In career fields where specialized training and/or certifications are required, the written materials associated with these prerequisites are often informative in the conduct of a RWM.</p>				
 Target Data Collection Procedure(s) 					
<p>Review of Written Mats.</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Job Observation</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Survey</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Interview</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Focus Groups</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Assessment of Physical Demands</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>

Exhibit 4-1 (Continued)
Review of Written Materials: Practice Description and Results

Type of Data Collected		
<p align="center">Task Descriptions</p> <p>Depending on the documents available, RWM can assist a job analyst in identifying required job tasks (Jones et al., 1982; McPhail et al., 2004; Gael, 1988, Brannick & Levine, 2002).</p>	<p align="center">Knowledge, Skills, & Abilities</p> <p>Depending on the documents available, RWM can assist a job analyst in identifying required knowledges, skills and abilities (Jones et al., 1982; McPhail et al., 2004; Gael, 1988, Brannick & Levine, 2002).</p>	<p align="center">Tools, Equipment, & Work Aides</p> <p>RWM can help an analyst identify necessary job tools, equipment, and work aids used by job incumbents (Gael, 1988; Jones et al., 1991; McPhail et al., 2004).</p>
<p align="center">Environmental Conditions/Work Context</p> <p>Using RWM, the job analyst can begin to describe the job context, such as physical working conditions, hazards, as well as personal and social aspects of each job (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1991; McPhail et al., 2004).</p>	<p align="center">Physical Demands</p> <p>In some instances, written materials reviewed can provide information related to the physical demands of the job and or minimum physical standards (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1982; McPhail et al., 2004; Robinson, 2009).</p>	<p align="center">Training & Educational Requirements</p> <p>Written materials will sometimes describe the preferred incumbent education level, required job related experiences and training needed (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1982; McPhail et al., 2004).</p>
<p align="center">Other Types of Data Collected</p> <p>Results of a comprehensive RWM may produce data related to work schedules, peak performance levels, travel, compensation, and other important job requirements (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1982; McPhail et al., 2004).</p>		
Resources Needed		
<p align="center">Length of Time to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (less than 1 month) <input type="radio"/> Medium (1 to 6 months) <input type="radio"/> Long (6 months of longer) <p>The RWM process is straightforward. There are no measurements involved, surveys or protocols to develop or new procedures to establish. Thus, there is little development time.</p>	<p align="center">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>Because the RWM process is straightforward, there is little development cost.</p>	

Exhibit 4-1 (Continued)
Review of Written Materials: Practice Description and Results

Resources Needed (Continued)	
<p align="center">Length of Time to Administer</p> <p><input type="radio"/> Short (less than 2 hours)</p> <p><input checked="" type="radio"/> Medium (2 hours to 5 hours)</p> <p><input type="radio"/> Long (5 hours or longer)</p> <p>If source materials are difficult to obtain, unclear, and/or lengthy, the review process can be time consuming.</p>	<p align="center">Monetary Cost to Administer</p> <p><input checked="" type="radio"/> Inexpensive</p> <p><input type="radio"/> Moderate</p> <p><input type="radio"/> Expensive</p> <p>There is no expensive equipment used and little additional resources beyond analyst time are needed.</p>
Data Documenting Resource(s)	
<p>Hard Copy/Structured Note Pages</p> <p>Hard copy notes should be taken during RWM in order to inform subsequent data collection (Jones et al., 1982; McPhail et al., 2004).</p>	
Additional Resource(s) Needed	
<p align="center">Meeting Space</p> <p>The job analyst may meet with stakeholders at the job site or a previously-designated meeting space to gather materials and securely transfer files (Carlisle, 1986; McPhail et al., 2004).</p>	<p align="center">Access to Organizational Materials</p> <p>Access to organizational materials, such as job descriptions and training materials, is needed in order to conduct a review of written materials (Carlisle, 1986; Gael, 1990).</p>
Pros/Cons	
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Allows job analyst to learn about the job and refine subsequent data collection practices (Biddle, 2009; Brannick & Levine, 2002; Brannick et al, 2007; Clifford, 2001; Gael, 1988; Jones et al., 1982; Peterson et. al., 2001) ▶ Cost efficient (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988) ▶ Requires few resources (Gael, 1988) ▶ Applies to almost all jobs (Gael, 1988) ▶ Research-supported procedure (Biddle, 2009; Brannick & Levine, 2002; Brannick et al, 2007; Clifford, 2001; Gael, 1988; Jones et al., 1982; Peterson et. al., 2001) 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ RWM is dependent on the availability of source documents, which can vary in usefulness (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988) ▶ Requires judgment on part of analyst since each document reviewed will provide only some of the job information required (Brannick et al, 2007; Clifford, 2001; Gael, 1988; Jones et al., 1982) ▶ Combing through long documents and aggregating job data from information presented in wide-ranging formats can be time consuming (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988)



Exhibit 4-1 (Continued)	
Review of Written Materials: Practice Description and Results	
 Expert Evaluation 	
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <p>▶ RWM used on its own will likely not be legally defensible because of the wide variety of materials available; however, as part of a larger job analysis methodology, it would likely be legally defensible.</p>	<ul style="list-style-type: none"> ▶ RWM serves as the starting point of most job analysis models and procedures (Gael, 1988; U.S. Department of Labor 1991; OHCOW, n.d.; Ohio Department of Administrative Services, 2006; Peterson et. al., 2001; Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Jones et al., 1982). ▶ RWM is a research-supported procedure (Gael, 1988; Peterson et. al., 2001; Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Jones et al., 1982). ▶ There is no reason to believe that the biases associated with archival data would systematically impact decisions made using these data.
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <p>▶ The validity of data collected through RWM can be enhanced by combining RWM with other data collection procedures.</p>	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input checked="" type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <p>▶ RWM provides helpful background information to inform subsequent job analysis procedures; however, data reliability is dependent on the quality of source information available.</p> <p>▶ Similar jobs/occupations may be performed differently across different US regions or different companies.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <p>▶ It is likely that job analysis experts and stakeholders would view RWM as a credible method as long as it is combined with other data collection procedures.</p>	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <p>▶ Analysts can be taught the basics of RWM fairly easily; however, the wide variation in materials that may be available to analyze increases the difficulty in teaching all aspects of this procedure.</p>

Exhibit 4-1 (Continued)
Review of Written Materials: Practice Description and Results



Expert Evaluation (Continued)



Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ Steps to ensure confidentiality can be implemented. For example, names and contact information could be redacted or the analyst could sign a confidentiality document for each organization.

Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ RWM is likely to result in an adequate return on resource investment as long as the search for archival data is a portion of the data collection, and that search ends with the information that is most useable and easy to obtain.

Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ RWM will provide information related to all jobs except those where written materials do not exist or are poorly documented.

Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ It is most likely that existing written materials will provide basic information about the job, but it is unlikely that these materials will be rich enough to obtain the granular detail that SSA needs.

Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ The likelihood that jobs will be described in terms of their core tasks and work activities will depend on the quality of background materials available, which varies from job to job.

Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ The likelihood that jobs will be described in terms of their minimum required KSA levels will depend on the quality of background materials available, which varies from job to job.

Chapter 5: Job Observation

This chapter provides a summary of job observation as a job analysis data collection procedure. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. This chapter summarizes job observations as a general data collection procedure that can be used alone or in combination with other data collection procedures in conducting successful job analyses.

Exhibit 5-1

Job Observation: Practice Description and Results

One procedure that can be used to collect job-related information is job observation. Job observation is a part of many established job analysis models, including the Position Analysis Questionnaire (McPhail, Jeanneret, McCormick, & Mecham, 2004), Functional Job Analysis (U.S. Department of Labor, 1991), and AET (Landau, Brauchler, & Rohmert, 2003), among others. It can be used to collect accurate information about job tasks and equipment/ materials used on the job as well as the work environment in which a job occurs (Carlisle, 1986). Job observation is typically useful for gathering work-related information (e.g., tasks) rather than worker-related information (e.g., knowledge, skills, or abilities) (Brannick, Levine, & Morgeson, 2007).

To complete a job observation, the analyst goes to the location where the subject job normally occurs and observes an incumbent performing the job. While observing a job, the analyst may interact with the incumbent or ask questions to clarify what the incumbent is doing. However, if interactions will distract the incumbent or create a dangerous situation, the analyst should not interact with the incumbent during the observation (Brannick et al., 2007). Having the incumbent take the analyst through a typical day ensures that a complete list of job tasks is obtained (Brannick et al., 2007). During the job observation, photographs can be taken or video and audio recording devices can be used in order to return to the information at a later time or as a means for documenting the information obtained (Brannick et al., 2007). Video recording can also be used if it is not feasible for the analyst to be in the job location in order to observe an incumbent performing the job (Cascio & Aguinis, 2011). Job observation is often combined with other job analysis procedures, such as interviews, in order to gain richer information and knowledge about the job (Brannick et al., 2007).

When considering job observation, it is important to understand that it is more appropriate for some jobs than others. Specifically, job observation is best for jobs that are standardized, have short cycles of tasks, and are more manual or physical than mental in nature (Cascio & Aguinis, 2011).

Job observation typically results in highly-detailed and customized information that is specific to the job being examined, which helps to provide a full picture of the job in question (Carlisle, 1986; Pearlman & Sanchez, 2010). However, job observations are often times costly and time consuming to conduct (Carlisle, 1986; Pearlman & Sanchez, 2010). When conducting job observations, they should be thoroughly documented in order to maintain a record of what was done and to defend in case of legal challenges (Sanchez & Levine, 2001).

Job Analysis Practice Highlights

- ▶ Can be used for a variety of positions or situations
- ▶ Allows for discovery and exploration of actual work demands
- ▶ Collects Task Descriptions, Tools, Equipment, and Work Aides; Environmental Conditions/Work Context; Physical Demands; Cognitive Demands; Knowledges, Skills, & Abilities; Personality Characteristics; Training & Educational Requirements; Minimum Entry Qualifications; Importance/Frequency Ratings; and Other Data
- ▶ Used in Occupational Health, Industrial/Organizational Psychology, Vocational Rehabilitation, and Ergonomics

Exhibit 5-1 (Continued) Job Observation: Practice Description and Results					
Discipline(s)					
Physical and Occupational Therapy	Occupational Health	Industrial/Organizational Psychology	Vocational Rehabilitation	Human Resources	Ergonomics
<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No
Quality & Data Considerations					
<p style="text-align: center;">Level of Detail in Data Collected</p> <p style="text-align: center;"> <input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise </p> <p>Most job observations include a detailed observation of an incumbent performing the job in its normal environment. This detailed observation results in a list of the major work activities performed on the job, but not exact measurements. Job observations can sometimes include making precise measurements using specified tools to measure precise distances, weights, and forces tasks that occur on the job, which can provide a precise and complete listing of job tasks (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Crandall, Klein, & Hoffman, 2006; Gael, 1988; Jacobs, 1997; Jones, Steffy, & Bray, 1991; Karwowski, 2006; Keyserling, Armstrong, & Punnett, 1991; Lowe & Krieg, 2009; McPhail et al., 2004; OHCOW, n.d.; Rodgers, 1992; U.S. Department of Labor, 1991).</p>		<p style="text-align: center;">Level of Job Performance Measured</p> <p style="text-align: center;"> <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal </p> <p>Job observations usually capture typical performance, as incumbents are watched while performing the job as they would normally (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Gael, 1988; McPhail et al., 2004; U.S. Department of Labor, 1991).</p>		<p style="text-align: center;">Security of Data</p> <p style="text-align: center;"> <input checked="" type="radio"/> Low <input type="radio"/> Moderate <input type="radio"/> High </p> <p>Data collected during job observations are documented using hard copy notes. Many of the job observation procedures do not include a secure means of storage or transportation for the collected data. However, some specific job observation models include a means for electronic storage of the data, which would increase security (Jacobs, 1997; Karwowski, 2006; Keyserling et al., 1991; Landau, et al., 2003; Lowe & Krieg, 2009; McPhail et al., 2004; OHCOW, n.d.; U.S. Department of Labor, 1991).</p>	

Exhibit 5-1 (Continued)
Job Observation: Practice Description and Results

Quality & Data Considerations (Continued)

Validity of Data	Reliability of Data/ Standardization of Procedures	Ease of Data Aggregation
<p>○ Low <input checked="" type="radio"/> Moderate ○ High</p> <p>A moderate amount of judgment is required to gather data using job observation. Specific measurements that are taken will be very precise, but the actual tasks observed can differ, leaving room for personal judgment. The accuracy of observations and ratings tends to be higher in jobs with low to moderate levels of cognitive and behavioral demands (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Crandall et al., 2006; Gael, 1988; Jacobs, 1997; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; Lowe & Krieg, 2009; Lysaght, Shaw, Almas, Jogia, & Larmour-Trode, 2008; McPhail et al., 2004; OHCOW, n.d.; Rodgers, 1992; U.S. Department of Labor, 1991).</p>	<p>○ Low <input checked="" type="radio"/> Moderate ○ Complete</p> <p>Job observation can vary based on the situation or analyst, therefore the level of standardization varies from low to moderate. However, with established models that use job observation, the process is generally the same across administrations (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Crandall et al., 2006; Gael, 1988; Jacobs, 1997; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; Lowe & Krieg, 2009; McPhail et al., 2004; OHCOW, n.d.; Rodgers, 1992; U.S. Department of Labor, 1991).</p>	<p><input checked="" type="radio"/> Difficult ○ Moderate ○ Easy</p> <p>Ease of aggregation is relatively difficult for job observations; however, many job analysis models that include job observation have pre-designated rating scales, which can ease aggregation. It will be more difficult to aggregate the data if qualitative observations are taken without a rating scale or easier if quantitative measurements are taken (Brannick & Levine, 2002; Brannick et al., 2007; Crandall, 2006; Gael, 1988; Jacobs, 1997; Jones et al., 1991; Karwowski, 2006; Lowe & Krieg, 2009; McPhail et al., 2004; OHCOW, n.d.; U.S. Department of Labor, 1991).</p>

Exhibit 5-1 (Continued)					
Job Observation: Practice Description and Results					
Data Source(s)					
<p style="text-align: center;">Incumbents</p> <p>Incumbents are the main source of job observation data. Incumbents are observed performing the complete job, and is especially useful when the job includes physical activities or unusual equipment or working conditions (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Crandall et al., 2006; DuBois, Shalin, Levi, & Borman, 1995; Gael, 1988; Gael, 1990; Heron, 2005; Jacobs, 1997; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; Landau et al., 2003; Lowe & Krieg, 2009; Lysaght et al., 2008; McPhail et al., 2004; OHCOW, n.d.; Rodgers, 1992; U.S. Department of Labor, 1991).</p>	<p style="text-align: center;">Direct Supervisors</p> <p>Although the analyst will observe the incumbent performing the job, the direct supervisor may explain what is occurring while the incumbent performs the job (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Heron, 2005; Keyserling et al., 1991; Rodgers, 1992).</p>	<p style="text-align: center;">Other Officials or Professionals</p> <p>Executive leadership, safety and health professionals, ergonomists, industrial hygienists, or other established officials at the jobsite can also provide information for job observations (Gael, 1988, Heron, 1995; Keyserling et al., 1991).</p>			
Target Data Collection Procedure(s)					
<p style="text-align: center;">Review of Written Mats.</p> <p style="text-align: center;"><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p style="text-align: center;">Job Observation</p> <p style="text-align: center;"><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p style="text-align: center;">Survey</p> <p style="text-align: center;"><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p style="text-align: center;">Interview</p> <p style="text-align: center;"><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p style="text-align: center;">Focus Groups</p> <p style="text-align: center;"><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p style="text-align: center;">Assessment of Physical Demands</p> <p style="text-align: center;"><input checked="" type="radio"/> Yes <input type="radio"/> No</p>

Exhibit 5-1 (Continued)
Job Observation: Practice Description and Results

Type of Data Collected		
<p align="center">Task Descriptions</p> <p>Using job observation, the basic work elements of the job should be identified, such as what a worker must do on the job, the number of tasks performed, the steps or sequence necessary to complete work, where and how incumbents get job-related information, and whether tasks are essential or non-essential (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Crandall et al., 2006; DuBois et al., 1995; Gael, 1988; Gael, 1990; Heron, 2005; Jacobs, 1997; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; Landau et al., 2003; McPhail et al., 2004; OHCOW, n.d.; Rodgers, 1992; U.S. Department of Labor, 1991).</p>	<p align="center">Tools, Equipment, & Work Aides</p> <p>During a job observation, information should be gathered regarding the machines, equipment, tools, gauges, materials, means of transport, controls, devices and their location on equipment, and work aids used on the job. Information about how the tools and equipment are used should also be included, such as if a tool must be used with the left hand (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Gael, 1988; Gael, 1990; Heron, 2005; Jacobs, 1997; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; Landau et al., 2003; McPhail et al., 2004; OHCOW, n.d.; U.S. Department of Labor, 1991).</p>	<p align="center">Environmental Conditions/Work Context</p> <p>Job observation can be used to gather information about the physical and social work context, such as noise, temperature, lighting, vibrations, ventilation, hazards, equipment placement, and required interactions with other people. During the observation, the work area can be sketched to provide information about the workplace layout (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Gael, 1988; Gael, 1990; Heron, 2005; Jacobs, 1997; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; Landau et al., 2003; McPhail et al., 2004; Rodgers, 1992; U.S. Department of Labor, 1991).</p>

Exhibit 5-1 (Continued)
Job Observation: Practice Description and Results

Exhibit 5-1 (Continued)		
Job Observation: Practice Description and Results		
Type of Data Collected (Continued)		
<p style="text-align: center;">Physical Demands</p> <p>Job observation can be used to collect information about the physical activities required to perform a job, such as body positions and postures, physical exertion or force requirements, counts of repetitive motions, activity level of specific limbs or body parts (e.g., finger extension or wrist flexion), body manipulation/coordination activities, endurance, physical stress or strain, muscle discomfort, and sensory inputs (e.g., vision, hearing, or smelling; Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Heron, 2005; Jacobs, 1997; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; Landau et al., 2003; McPhail et al., 2004; OHCOW, n.d.; Rodgers, 1992; U.S. Department of Labor, 1991).</p>	<p style="text-align: center;">Cognitive Demands</p> <p>Job observation can be used to assess cognitive demands, such as reasoning, decision making, information processing, time pressure, and short-term memory (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Crandall et al., 2006; DuBois et al., 1995; Gael, 1988; Heron, 2005; Jones et al., 1991; Karwowski, 2006; Landau et al., 2003; Lysaght et al., 2008; McPhail et al., 2004; U.S. Department of Labor, 1991).</p>	<p style="text-align: center;">Knowledges, Skills, & Abilities</p> <p>Job observation can be used to collect data about knowledges, skills, and abilities such as declarative, procedural, or self knowledge, and math, oral, or written abilities necessary to perform the job (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Crandall et al., 2006; DuBois et al., 1995; Gael, 1988; Heron, 2005; Jones et al., 1991; Lysaght et al., 2008).</p>
<p style="text-align: center;">Personality Characteristics</p> <p>Job observation can be used to assess aptitudes, interests, and temperaments as well as other “will do” or attitudinal factors necessary for the job (Gael, 1988; Heron, 2005; Lowe & Krieg, 2009; Lysaght et al., 2008; U.S. Department of Labor, 1991).</p>	<p style="text-align: center;">Training & Educational Requirements</p> <p>Job observation can be used to collect information about vocational preparation, education, job-specific experience, and training (Gael, 1988; Heron, 2005; McPhail et al., 2004; U.S. Department of Labor, 1991).</p>	<p style="text-align: center;">Worker Functions</p> <p>As part of a job observation, ratings can be made using Worker Function scales for Functional Job Analysis (U.S. Department of Labor, 1991). These scales include ratings of interactions with people, data, and things (Gael, 1988; Jones et al., 1991; U.S. Department of Labor, 1991).</p>

Exhibit 5-1 (Continued)
Job Observation: Practice Description and Results

Type of Data Collected (Continued)		
<p>Minimum Entry Qualifications</p> <p>Job observation can be used to gather information about minimum entry qualifications such as required licensing or certification or necessary personal attributes (Heron, 2005; McPhail et al., 2004).</p>	<p>Importance/Frequency Ratings</p> <p>Job observation can be used to determine the frequency, intensity, duration, and importance or significance of various requirements on the job (Brannick & Levine, 2002; Brannick et al., 2007; DuBois et al., 1995; Gael, 1988; Heron, 2005; Jacobs, 1997; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; Landau et al., 2003; McPhail et al., 2004; OHCOW, n.d.; Rodgers, 1992).</p>	<p>Other Types of Data Collected</p> <p>Job observation can be used to collect other types of data, such as the characteristics of the worker being observed and where the observation occurs, the work schedule (e.g., shifts, breaks, required overtime), incumbent compensation and benefits, travel, exempt status, work standards or evaluation, time required to complete tasks, non-environmental hazards (e.g., poor performance leading to hazards for others), control over conditions, and outputs (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Gael, 1988; Heron, 2005; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; McPhail et al., 2004; OHCOW, n.d.; Rodgers, 1992; U.S. Department of Labor, 1991).</p>
Resources Needed		
<p>Length of Time to Develop</p> <ul style="list-style-type: none"> <input type="radio"/> Short (e.g., less than 1 month) <input checked="" type="radio"/> Medium (e.g., 1 to 6 months) <input type="radio"/> Long (e.g., 6 months or longer) <p>The amount of time necessary to develop a job observation can vary greatly depending on whether an established method is being used. If using an established instrument, development time will be short whereas it can be quite long (e.g., over 6 months) if task statements need to be developed for the job observations (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Gael, 1990; OHCOW, n.d.).</p>	<p>Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>Developing an observation system is expensive; however, using existing systems is inexpensive (Gael, 1988; OHCOW, n.d.).</p>	

Exhibit 5-1 (Continued)
Job Observation: Practice Description and Results

Resources Needed (Continued)



Length of Time to Administer

- Short (e.g., less than 2 hours)
- Medium (e.g., 2 hours to 5 hours)
- Long (e.g., 5 hours or longer)

Job observations must be conducted over an extended amount of time in order to produce accurate results. It is a very time-consuming process (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Gael, 1988; Gael, 1990; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; Landau et al., 2003; OHCOW, n.d.).

Monetary Cost to Administer

- Inexpensive
- Moderate
- Expensive

Special equipment does not have to be purchased in order to conduct a job observation as it takes place in the location where the job normally occurs, using the equipment that is already on site for the job (Gael, 1988; Lowe & Krieg, 2009).

Data Documenting Resource(s)

Hard Copy/Structured Note Pages

Hard copy notes should be recorded during the job observation in order to recall information or make ratings at a later time (Carlisle, 1986; Gael, 1988; Gael, 1990; Heron, 2005; 1990; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; Landau et al., 2003; McPhail et al., 2004; OHCOW, n.d.).

Video Recorder

A video recorder is not necessary, but can be helpful for complex tasks and to allow for review of tasks or for playback, such as slow motion playback, for jobs that have rapid movements. Using a video recorder can reduce the amount of time that needs to be spent observing (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; DuBois et al., 1995; Gael, 1988; Gael, 1990; Jacobs, 1997; Keyserling et al., 1991; Lowe & Krieg, 2009; OHCOW, n.d.; Rodgers, 1992).

Work/Job Analysis Instrument

If using job observation as part of an established job analysis method, there is likely a specified job analysis instrument to be used during the observation. Job analysis instruments may include a list of things to look for during the job observation (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jacobs, 1997; Lysaght et al., 2008; McPhail et al., 2004; Rodgers, 1992; U.S. Department of Labor, 1991).

Camera

A camera is not necessary, but can be used to take pictures of equipment or movements during the job observation and used for later reference (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Gael, 1990; Jacobs, 1997; Keyserling et al., 1991; OHCOW, n.d.).

Stopwatch

A stopwatch can be used to signal the start and end of observation periods, to measure how long it takes to perform specific tasks, or to measure cycle times and amount of exposure to risk factors (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jacobs, 1997; Keyserling et al., 1991; OHCOW, n.d.; Rodgers, 1992).

Scale

A scale may be needed in order to weigh objects that need to be lifted or tools that are used on the job (Gael, 1988; Jacobs, 1997; Keyserling et al., 1991; OHCOW, n.d.; Rodgers, 1992).

Exhibit 5-1 (Continued)
Job Observation: Practice Description and Results

Resources Needed (Continued)	
<i>Data Documenting Resource(s) (Continued)</i>	
<p>Voice Recorder</p> <p>A voice recorder can be used to ease later understanding of incumbents' vocalizations made during the job observation (Brannick & Levine, 2002; Brannick et al., 2007; DuBois et al., 1995; Gael, 1988).</p>	<p>Tape Measure</p> <p>A tape measure can be used to measure distances, such as how far an employee must reach or various lift distances (Jacobs, 1997; Keyserling et al., 1991; OHCOW, n.d.; Rodgers, 1992).</p>
<p>Other Tools</p> <p>Other tools may be needed to measure or document job analysis data, such as a torque wrench, protractor, wheeled measuring device, push-pull gauge, pliers, grip and pinch force gauge, data recording machine, mechanical wrist counter, computer software, calculator, or other miscellaneous supplies such as clipboards, gloves, or a box to carry all of the tools (Carlisle, 1986; Gael, 1988; Jacobs, 1997; Keyserling et al., 1991; OHCOW, n.d.).</p>	
<i>Additional Resource(s) Needed</i>	
<p>Access to Workspace</p> <p>Access to the incumbent's normal workspace is necessary in order to observe the incumbent performing the job as it typically occurs and complete an accurate job observation (Carlisle, 1986; DuBois et al., 1995; Gael, 1990; Jacobs, 1997; Jones et al., 1991; Karwowski, 2006; Keyserling et al., 1991; Landau et al., 2003; Lowe & Krieg, 2009; McPhail et al., 2004; OHCOW; Rodgers, 1992).</p>	<p>Computer</p> <p>If an established job analysis method is being used, such as the Position Analysis Questionnaire, a computer may be necessary in order to enter the data collected (McPhail et al., 2004; OHCOW, n.d.).</p>
Pros/Cons	
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Gives insight and information that it is not possible to get in any other way (Crandall et al., 2006) ▶ Less biased than incumbent self-reports (Brannick & Levine, 2002; Brannick et al., 2007) ▶ Can be applied to many work activities in various industries (Gael, 1988) 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Can be very time-consuming and costly (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Gael, 1988) ▶ Can be difficult to analyze (Carlisle, 1986) ▶ Observers have to be highly skilled in order to capture what is going on (Crandall et al., 2006)





Exhibit 5-1 (Continued) Job Observation: Practice Description and Results	
 Pros/Cons (Continued) 	
<ul style="list-style-type: none"> ▶ Construct validity has been demonstrated for some models that use job observation as a data collection procedure (Gael, 1988) ▶ Establishes face validity and acceptance by incumbents and supervisors (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988) ▶ Results in a complete listing of work equipment, materials, and activities (Carlisle, 1986) ▶ Ensures job components are not omitted because of being studied out of context (DuBois et al., 1995) ▶ Incumbents can demonstrate various aspects of the job rather than having to describe them (U.S. Department of Labor, 1991) 	<ul style="list-style-type: none"> ▶ May be of limited use in jobs that are hard to observe or have substantial thinking components (e.g., reading documents) (Gael, 1990) ▶ Events observed may not be typical or representative of the job (Crandall et al., 2006) ▶ May not be feasible because of risk to observers or chance of observer getting in the way (Crandall et al., 2006) ▶ If incumbents feel they need to impress or please the analyst, data collected may not be accurate (Lysaght et al., 2008) ▶ Job observations may not be appropriate for all jobs, such as those that are primarily cognitive in nature or that involve many infrequently performed tasks.
 Expert Evaluation 	
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <ul style="list-style-type: none"> ▶ Job observation is a widely used and trusted job analysis procedure that is a part of many established job analysis models. ▶ Job observations need to be combined with other methods, as important data may not be evident during the observation period (e.g., tasks that are performed infrequently) 	<ul style="list-style-type: none"> ▶ In order to ensure legal defensibility, job observations should be thoroughly documented (Sanchez & Levine, 2001) ▶ Construct validity has been demonstrated for some models that use job observation as a data collection procedure (Gael, 1988) ▶ Establishes face validity and acceptance by incumbents and supervisors (Brannick & Levine, 2002; Brannick et al., 2007, Gael, 1988)



Exhibit 5-1 (Continued) Job Observation: Practice Description and Results	
 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ This procedure collects observable data; however, the data that are collected should be verified by SMEs to ensure correct interpretation by the analyst.</p>	<p>▶ With a proper protocol and full access to incumbent work activities, this practice should produce reliable data.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ Job observation is a widely used and trusted job analysis procedure that is a part of many established job analysis models; however, it should be combined with other data collection procedures.</p>	<p>▶ Job observation techniques can be easily trained, and analysts can be instructed on a specific procedure to follow during the observation.</p>
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Steps to ensure confidentiality can be implemented, such as requiring analysts to sign a confidentiality document for each organization.</p>	<p>▶ Job observations can be relatively costly when performed on a large scale; however, they offer many benefits and can be combined with lower cost procedures (e.g., surveys).</p>

Exhibit 5-1 (Continued)
Job Observation: Practice Description and Results



Expert Evaluation (Continued)



Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

▶ It may not be possible to gather useful data through job observations for all occupations, such as those that are primarily cognitive in nature and those that involve a large number of tasks that are performed infrequently.

Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

▶ Job observations can collect moderately granular data; however, it may be necessary to collect additional, more detailed data through other data collection procedures.

Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

▶ It is likely that job observations can collect data on tasks and work activities; however, it may be necessary to gather information on infrequent tasks and tasks that are not directly observable through other means.

Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

▶ KSAs can be difficult to infer through job observation alone and may require clarification from SMEs.

Chapter 6: Survey

This chapter provides a summary of surveys as a job analysis data collection procedure. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. This chapter summarizes surveys as a general data collection procedure that can be used alone or in combination with other data collection procedures in conducting successful job analyses.

Exhibit 6-1 Survey: Practice Description and Results

Surveys are a popular way to collect job analysis data. They have been used on their own or in combination with other data collection procedures (e.g., job observation or interview) to successfully complete a job analysis on one job (Gael, 1990; Peterson, Mumford, Borman, Jeanneret, & Fleishman, 1995). Surveys can be administered in many different ways. For example, surveys can be paper-and-pencil or Web-based. Paper-and-pencil surveys can be administered via email, physical mail, or manually (i.e., handing a survey to an individual or a group of individuals for them to complete immediately). Job analysis survey data are generally easy to aggregate because the majority of data are collected via Likert-type scales and thus, is quantitative data (Biddle, 2009; Clifford, 2001; Jones, Steffy, & Bray, 1991; McPhail, Jeanneret, McCormick, & Mecham, 2004; Radziewicz, 1998; Sumer, Sumer, Demirutky, & Cifci, 2001; Wei & Salvendy, 2000).

Job Analysis Practice Highlights

- ▶ Economical in terms of time and money to develop and administer.
- ▶ Can collect almost any type of job analysis data, including importance ratings, tasks, incumbent characteristics, or contextual data.
- ▶ Is used in Physical and Occupational Therapy, Industrial/Organizational Psychology, Vocational Rehabilitation, Human Resources, Human Factors, and Vocational Counseling.

Job analysis surveys have been used to collect data from incumbents (Brannick & Levine, 2002; Brannick, Levine, & Morgeson, 2007; Carlisle, 1986; Clifford, 2001; Crandall, Klein, & Hoffman, 2006; Gael, 1988; Gael, 1990; Gatewood, Feild, & Barrick, 2008; Jones et al., 1991; McPhail et al., 2004; Radziewicz, 1998; Sumer et al., 2001; Wei & Salvendy, 2000), direct supervisors (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Gael, 1990; Gatewood et al., 2008; Jones et al., 1991; Peterson et al., 1995), HR Professionals (Brannick & Levine, 2002; Brannick et al., 2007; Gatewood et al., 2008; Radziewicz, 1998), and other job-knowledgeable employees (Gael, 1988; Gael, 1990). Surveys can collect almost any type of data, including importance ratings (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Clifford, 2001; Gael, 1988; Gael, 1990; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004; Peterson et al., 1995; Radziewicz, 1998; Robinson, 2009; Sumer et al., 2001; Wei & Salvendy, 2000), tasks (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Crandall et al., 2006; Gael, 1988; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004; Peterson et al., 1995; Radziewicz, 1998; Robinson, 2009), incumbent characteristics (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Crandall et al., 2006; Gael, 1988; Gatewood et al., 2008; Jones et al., 1991; Peterson et al., 1995; Robinson, 2009; Radziewicz, 1998; Sumer et al., 2001), or contextual data (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Crandall et al., 2006; Gael, 1988; Gatewood et al., 2008; Jones et al., 1991; Peterson et al., 1995; Robinson, 2009; Radziewicz, 1998; Sumer et al., 2001).

Exhibit 6-1 (Continued)
Survey: Practice Description and Results

Although the validity and accuracy of job analysis data depends greatly on the content of the survey, surveys are generally time- and cost-effective means of collecting a large amount of data from a large number of job experts (who may be geographically dispersed) across a wide spectrum of jobs (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Gael, 1988; Gael, 1990; Gatewood et al., 2008; Peterson et al., 1995; Wei & Salvendy, 2000). Additionally, the uniformity and standardization of a survey allows for similar interpretations and comparisons of job data obtained from a variety of jobs and locations (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1990; Gatewood et al., 2008). Despite the time- and cost-effectiveness of job analysis surveys, it has been acknowledged that other data collection procedures (e.g., job observation or interview) should be used to supplement or validate the data collected via a job analysis survey (Gael, 1990).

Discipline(s)					
Physical and Occupational Therapy <input checked="" type="radio"/> Yes <input type="radio"/> No	Occupational Health <input type="radio"/> Yes <input checked="" type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input checked="" type="radio"/> Yes <input type="radio"/> No	Human Resources <input checked="" type="radio"/> Yes <input type="radio"/> No	Ergonomics <input type="radio"/> Yes <input checked="" type="radio"/> No
Other: Human Factors <input checked="" type="radio"/> Yes <input type="radio"/> No	Other: Vocational Counseling <input checked="" type="radio"/> Yes <input type="radio"/> No	Intentionally Left Blank			

Exhibit 6-1 (Continued)
Survey: Practice Description and Results

Quality & Data Considerations

<p>Level of Detail in Data Collected</p> <ul style="list-style-type: none"> <input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise 	<p>Level of Job Performance Measured</p> <ul style="list-style-type: none"> <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal 	<p>Security of Data</p> <ul style="list-style-type: none"> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High
<p>The level of detail that survey can collect varies by the content of the survey. For example, a survey can ask for ratings about specific tasks (Brannick & Levine, 2002; Brannick, et al., 2007; Jones et al., 1991) or personality attributes (Sumer et al., 2001), but may also only have more general job items or work activities (Brannick & Levine, 2002; Brannick et al., 2007; Jones et al., 1991; Peterson et al., 1995).</p>	<p>Surveys can collect data on minimal, average, and/or maximal performance, depending on survey instructions and item content, though many job analysis survey methodologies discuss typical or average performance (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Crandall et al., 2006; Gael, 1988; McPhail et al., 2004). Some job analysis surveys (e.g., Job Elements Method Survey; Brannick & Levine, 2002; Brannick et al., 2007; or Threshold Traits Analysis System; Gael, 1988) collect data on minimal or maximal performance.</p>	<p>Paper-and-pencil surveys (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Jones et al., 1991; Sumer et al., 2001; Peterson et al., 1995; Wei & Salvendy, 2000) vary in the level of security based on how they are distributed (e.g., electronically through email, via physical mail and individually mailed back, manually administered in one room) and synthesized for data analysis (e.g., hard copies manually analyzed, entered into a computer program for data analysis). Typically, electronic means of distribution and analysis increase security of data (Gael, 1988). Web-based surveys (Robinson, 2009) disseminate, collect, and maintain data electronically and are typically more secure than paper-and-pencil surveys and allows for fewer opportunities for human error or security breaches.</p>

Exhibit 6-1 (Continued)
Survey: Practice Description and Results

Quality & Data Considerations (Continued)

Validity of Data	Reliability of Data/ Standardization of Procedures	Ease of Data Aggregation
<p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High </p> <p>The validity of survey data greatly depends on the survey content (Crandall et al., 2006). Generally, surveys allow job analysts to collect data in a way that limits or eliminates analyst judgment compared to other job analysis data collection procedures (e.g., job observation). Collecting survey data from a large number of participants increases validity, though uninformed opinion may dilute the accuracy of results (Carlisle, 1986). It also helps to compare incumbent data to supervisor data or other data from other procedures (e.g., interview) to ensure data is valid (Clifford, 2001; Gael, 1990).</p>	<p> <input type="radio"/> Low <input type="radio"/> Moderate <input checked="" type="radio"/> Complete </p> <p>Paper surveys are very standardized and each participant receives the same job analysis experience each time (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1991; Peterson et al., 1995; Radziewicz, 1998; Sumer et al., 2001; Wei & Salvendy, 2000). Certain job analysis surveys (e.g., Guidelines Oriented Job Analysis, GOJA; Biddle, 2009; or Web-based surveys), allow for some flexibility in survey items (e.g., through skip patterns) and so the consistency of the job analysis process may slightly vary from participant to participant (Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Gael, 1988; Radziewicz, 1998).</p>	<p> <input type="radio"/> Difficult <input type="radio"/> Moderate <input checked="" type="radio"/> Easy </p> <p>Job analysis survey data are often quantitative (e.g., Likert-type rating scales; Biddle, 2009; Clifford, 2001; Jones et al, 1991; McPhail et al., 2004; Radziewicz, 1998; Sumer et al., 2001; Wei & Salvendy, 2000) and allow for easy combination and data analysis (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Peterson et al., 1999).</p>

Exhibit 6-1 (Continued)
Survey: Practice Description and Results

Exhibit 6-1 (Continued) Survey: Practice Description and Results					
Data Source(s)					
<p>Incumbents</p> <p>Incumbents who have sufficient experience to know the job are the most common source of data (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Clifford, 2001; Crandall et al., 2006; Gael, 1988; Gael, 1990; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004; Radziewicz, 1998; Sumer et al., 2001; Wei & Salvendy, 2000). Incumbents should have at least one year of job experience to most accurately reflect the job (Biddle, 2009) and a sufficient reading level (e.g., at least sixth grade for O*NET survey; Peterson et al., 1995).</p>		<p>Direct Supervisors</p> <p>Supervisors can also be invited to fill out job analysis surveys, especially if they have had relevant and recent experience on the job in question or are knowledge based on their supervisory position (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Gael, 1990; Gatewood et al., 2008; Jones et al., 1991). Supervisors should have a sufficient reading level (e.g., at least sixth grade for O*NET survey; Peterson et al., 1995). Supervisors may be more likely to contribute data on knowledge, skills, and abilities because they are often more familiar than incumbents with thinking about the kinds of people who would be or are successful in the jobs (Brannick & Levine, 2002; Brannick et al., 2007).</p>			
<p>HR Professionals</p> <p>Subject matter experts, such as Industrial/Organizational Psychologists or Business Professors, can be used to make job analysis survey ratings (Gatewood et al., 2008; Radziewicz, 1998). Additionally, trainers can contribute data on knowledge, skills, and abilities because they are often more familiar than incumbents with thinking about the kinds of people who would be or are successful in the jobs (Brannick & Levine, 2002; Brannick et al., 2007).</p>		<p>Other Data Source</p> <p>Any job-knowledgeable employees may be surveyed about the tasks that job incumbents perform to accomplish their work (Gael, 1988; Gael, 1990).</p>			
Target Data Collection Procedure(s)					
<p>Review of Written Mats.</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Job Observation</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Survey</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Interview</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Focus Groups</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Assessment of Physical Demands</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>

Exhibit 6-1 (Continued)
Survey: Practice Description and Results

Type of Data Collected		
<p align="center">Importance/Frequency of Activities</p> <p>A job analysis survey is often used to collect data on importance, criticality, difficulty, or frequency of activities/ tasks/ skills (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Clifford, 2001; Gael, 1988; Gael, 1990; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004; Peterson et al., 1995; Radziewicz, 1998; Robinson, 2009; Sumer et al., 2001; Wei & Salvendy, 2000).</p>	<p align="center">Task Descriptions</p> <p>Job experts can be asked via survey to list job duties performed, including what, why, and how duties are completed (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Crandall et al., 2006; Gael, 1988; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004; Peterson et al., 1995; Radziewicz, 1998; Robinson, 2009).</p>	<p align="center">Knowledge, Skills, and Abilities</p> <p>A job analysis survey can contain items about the necessity of an incumbent to possess certain knowledge, skills, and abilities, such as the ability to read, write, do math, sales ability, oral comprehension, or spelling (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Crandall et al., 2006; Gael, 1988; Gatewood et al., 2008; Jones et al., 1991; Peterson et al., 1995; Robinson, 2009; Radziewicz, 1998; Sumer et al., 2001).</p>
<p align="center">Environmental Conditions/Work Context</p> <p>Data related to the working and environmental conditions (e.g., working outside, unusual lighting, experiencing loud noises) can be collected in the background or personal information section of a job analysis survey (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Gael, 1990; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004; Peterson et al., 1995; Robinson, 2009).</p>	<p align="center">Tools, Equipment, and Work Aides</p> <p>A job analysis survey can ask job experts to list or indicate the use of office equipment, tools, machines, and safety gear/clothing that are required for the job (Biddle, 2009; Clifford, 2001; Gael, 1988; Gael, 1990; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004; Radziewicz, 1998).</p>	<p align="center">Cognitive Demands</p> <p>A job analysis survey can include items that ask about cognitive demands, such as problem solving, memory, information processing, analyzing information, deductive reasoning, and recall abilities (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Gael, 1988; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004; Peterson et al., 1995; Radziewicz, 1998; Robinson, 2009; Wei & Salvendy, 2000).</p>

Exhibit 6-1 (Continued)
Survey: Practice Description and Results

Type of Data Collected (Continued)

<p align="center">Physical Demands</p> <p>A job analysis survey (e.g., Guidelines Oriented Job Analysis; Biddle, 2009) can assess the necessity to see, hear, walk, carry items, balance to perform a job, as well as body positions, repetitive motions, body coordination, strength, and body flexibility (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004; Peterson et al., 1995; Radziewicz, 1998).</p>	<p align="center">Personality Characteristics</p> <p>A job analysis survey can assess the need for certain personality characteristics, such as conscientiousness, emotional stability, or integrity (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1991; Peterson et al., 1995; Sumer et al., 2001).</p>	<p align="center">Minimum Entry Qualifications</p> <p>A job analysis survey can assess minimum entry qualifications, such as if a drivers license, certification, or bonding is required (Biddle, 2009; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004; Peterson et al., 1995).</p>
<p align="center">Training and Educational Requirements</p> <p>A job analysis survey can measure education, job-related experience, and training required of incumbents, such as on-site training or apprenticeships (Gael, 1988; McPhail et al., 2004; Peterson et al., 1995)</p>	<p align="center">Worker Functions</p> <p>Ratings can be made via a job analysis survey of people, data, and things using Worker Function Scales (e.g., Functional Job Analysis; Gael, 1988; Gael, 1990; Jones et al., 1991).</p>	<p align="center">Other Data Collected</p> <p>A job analysis survey can be used to collect personal data from respondents, such as their educational level, company or position tenure, or demographics variables, as well as other data such as typical work days for the job, overtime requirements, and required travel (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Gael, 1990; Jones et al., 1991; McPhail et al., 2004; Peterson et al., 1995; Sumer et al., 2001).</p>

Exhibit 6-1 (Continued)
Survey: Practice Description and Results



Resources Needed



Length of Time to Develop

- Short (e.g., less than 1 month)
- Medium (e.g., 1 to 6 months)
- Long (e.g., 6 months or longer)

Because surveys require less analyst judgment than other data collection procedures, less time is needed to train job analysts (Carlisle, 1986), however, surveys that are not off-the-shelf require time and effort to develop (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988). If surveys have to be individualized for a specific job, survey development time will increase substantially (Jones et al., 1991).

Monetary Cost to Develop

- Inexpensive
- Moderate
- Expensive

Job analysis surveys are more cost effective than other job analysis data collection procedures (Clifford, 2001; Gael, 1988; McPhail et al., 2004). Purchasing an off-the-shelf job analysis survey may require some monetary cost for the copyrighted instrument or survey software system, while developing customized job analysis survey content requires almost no monetary cost.

Length of Time to Administer

- Short (e.g., less than 30 min)
- Medium (e.g., 30 min to 2 hours)
- Long (e.g., 2 hours or longer)

Overall, administration of a job analysis survey requires less job analyst time than some other data collection procedures because data can be collected from many job incumbents or experts at the same time (Gael, 1988; Peterson et al., 1999; Radziewicz, 1998). The amount of job analyst time it takes to administer a survey varies greatly by the method the survey is administered. Web-based surveys or paper-and-pencil surveys distributed in bulk (e.g., through physical mail) take less job analyst time than surveys manually administered to individuals or small groups of participants. The amount of job expert time necessary to complete a survey depends on the length of the survey content (e.g., number of items) (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988).

Monetary Cost to Administer

- Inexpensive
- Moderate
- Expensive

Data analysis surveys are more cost effective than other job analysis data collection procedures (Clifford, 2001; Gael, 1988). Paper-and-pencil surveys cost resources (e.g., paper, stamps if mailing), but are generally cost-effective. Web-based surveys require a survey software system, which can vary greatly in monetary costs.

Exhibit 6-1 (Continued)
Survey: Practice Description and Results

Resources Needed (Continued)		
<i>Data Documenting Resource(s)</i>		
Work/Job Analysis Instrument	Computer Software	Hard copy/Structured Note Pages
A work analysis instrument can be used as the basis for a job analysis survey (Biddle, 2009; Gael, 1988; Jones et al., 1991; McPhail et al., 2004; Peterson et al., 1995; Radziewicz, 1998; Wei & Salvendy, 2000).	A computer-based system (e.g., Web-based survey software) can help house the survey items as well as collect, store, and analyze data (Clifford, 2001; Gael, 1990; Gatewood et al., 2008; McPhail et al., 2004).	Paper-and-pencil surveys include physical pages of paper containing survey items where job experts are often able to indicate their responses directly on the pages (Gael, 1990; Gatewood et al., 2008; McPhail et al., 2004).
<i>Additional Resource(s) Needed</i>		
Meeting Space	Computer	Web Access
Meeting space may be required if a paper-and-pencil survey is administered manually to an individual or a group of job experts (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Gael, 1988; Gatewood et al., 2008; Robinson, 2009).	A computer may be required if a job analysis survey is either administered online or if paper-and-pencil survey data are converted to an electronic format for data analysis (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Gael, 1990; Gatewood et al., 2008).	Web Access may be required if a job analysis survey is Web-based, if a paper-and-pencil survey is sent via email, or if paper-and-pencil survey data are transmitted electronically to a central place for data storage and analysis (Robinson, 2009).
Pros/Cons		
Positive Aspects of Practice	Negative Aspects of Practice	
<ul style="list-style-type: none"> ▶ Allows for the accumulation of large amounts of job data (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1990) ▶ Efficient when gathering data on widely-dispersed employees (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1990) ▶ Potentially applicable to a wide spectrum of jobs/occupations (Gael, 1988; Gatewood et al., 2008; Peterson et al., 1995) 	<ul style="list-style-type: none"> ▶ Because surveys are relatively easy to administer to large groups of job experts, uninformed opinion may dilute the accuracy of the results (Carlisle, 1986) ▶ May require a minimum reading level that all job experts may not have (Gael, 1988; Gatewood et al., 2008) ▶ If the content of the survey is very long, it may be overwhelming to a job expert (Peterson et al., 1995) 	

Exhibit 6-1 (Continued)
Survey: Practice Description and Results





Exhibit 6-1 (Continued) Survey: Practice Description and Results	
 Pros/Cons (Continued) 	
<ul style="list-style-type: none"> ▶ Economical in terms of time and money (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Gael, 1988; Gael, 1990; Peterson et al., 1995; Wei & Salvendy, 2000) ▶ The uniformity and standardization of a survey allows for similar interpretations and comparisons of job data obtained from a variety of jobs and locations (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1990; Gatewood et al., 2008) ▶ Good for jobs that are difficult to observe (e.g., managerial jobs; Brannick & Levine, 2002; Brannick et al., 2007) ▶ Requires less job analyst training than other data collection procedures (Carlisle, 1986; Gael, 1988) ▶ Survey data stored electronically are easily accessible for future use (Gael, 1990) 	<ul style="list-style-type: none"> ▶ Requires/assumes that incumbents or job experts are knowledgeable and able to accurately self-report job data and will not respond in a socially-desirable way (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Gael, 1988; Peterson et al., 1995) ▶ The comprehensiveness of data relies completely on the survey items (i.e., will give you no data on things you forgot to put on the survey; Brannick & Levine, 2002; Brannick et al., 2007)
 Expert Evaluation 	
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <p>▶ Surveys produce reliable, valid data, but should be combined with other procedures to gather data specific to the occupation (e.g., the specific tasks performed).</p>	<ul style="list-style-type: none"> ▶ Care needs to be taken to ensure that the sample is representative, the items are comprehensive, and SMEs do not have a vested interest in biasing the outcome of the survey. ▶ Surveys are efficient and cost-effective means of collecting comparable job analysis data across a wide range of job types that serves a critical role in most job analysis models and practices (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Gael, 1988; Gael, 1990; Gatewood et al., 2008; Peterson et al., 1995; Wei & Salvendy, 2000).

Exhibit 6-1 (Continued)
Survey: Practice Description and Results



 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ Surveys should be combined with other data collection procedures to ensure the validity of the data.</p>	<p>▶ Well constructed surveys should result in reliable job analysis data.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ Surveys are often employed for job analyses and are very likely to be viewed as credible as long as they are combined with other data collection procedures.</p>	<p>▶ Assuming analysts will not be involved in survey development or data analysis, training job analysts to administer surveys will be very easy.</p>
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ Surveys are less likely to collect proprietary information than other data collection procedures and do not require an on-site visit.</p> <p>▶ All data are entered and stored electronically when Web surveys are employed.</p>	<p>▶ Surveys are relatively low cost and involve minimal labor expense.</p>

Exhibit 6-1 (Continued)
Survey: Practice Description and Results



Expert Evaluation (Continued)



Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ Job analysis surveys can be administered for any occupation. Some surveys are designed to be general enough to apply to any job in the labor market, while other surveys apply consistent rating scales to more specific data collected through other procedures (e.g., collecting ratings on specific tasks and KSAs).

Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ Although the granularity of data collected depends on the survey items, survey data do not tend to provide the depth of information collected through other procedures and may not provide specific detail about an occupation.

Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ Surveys can easily collect information about the work activities and often involve making ratings such as task frequency or importance.

Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ It is possible to gather KSA data if incorporated into the survey content; however, it can be difficult to get obtain highly specific KSA data about an occupation without additional qualitative data.

Chapter 7: Structured Interviews

This chapter provides a summary of structured interviews as a job analysis data collection procedure. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. This chapter summarizes structured interviews as a general data collection procedure that can be used alone or in combination with other data collection procedures in conducting successful job analyses.

Exhibit 7-1

Structured Interviews: Practice Description and Results

A structured job analysis interview consists of a trained analyst asking prepared questions about the tasks and responsibilities; knowledge, skills, and abilities (KSAs) required; work environment; equipment; and/or conditions of employment for a job (Gatewood, Feild, & Barrick, 2008). These data are typically collected through interviews with incumbents or supervisors (Gatewood et al., 2008). It is important that the job data collected during this process are "clear, specific, precise, complete yet brief, and relevant to the activity being defined (Carlisle, 1986)." Furthermore, the analyst must make certain that the data collected are adequate enough to ensure a comprehensive understanding of the job and the job's environment. This typically requires a close adherence to a structured interview protocol as well as probing on the part of the analyst (Brannick & Levine, 2002; Carlisle, 1986; Clifford, 2001; Crandall, Klein, & Hoffman, 2006; Gael, 1988).

While structured interviews are standard components of most job analysis practices, the interview procedure is particularly vital when minimal background documentation exist and/or experienced incumbents are the main source of job information (Jones, Steffy, & Bray, 1991; Karwowski, 2006; Landau, Brauchler, & Rohmert, 2003; McPhail, Jeanneret, McCormick, & Mecham, 2004; Peterson, Mumford, Borman, Jeanneret, Fleishman, & Campion, 2001). In all instances, interviews are important when job information needs additional detailing.

Both telephonic and face-to-face interviews produce valuable job data; however, conducting the structured interview in person may have an added benefit for the analyst. Face-to-face interviews sometimes permit the analyst to tour the workplace with the incumbent, letting the analyst visually notice job information that may not have surfaced during a phone or desk interview (Brannick & Levine, 2002; Carlisle, 1986; Gael, 1988). This allows the analyst to further probe about major tasks, the nature of the work environment, equipment used, and incumbent interactions.

Job Analysis Practice Highlights

- ▶ Structured interviews allow analysts to collect detailed job information through the direct questioning of incumbents.
- ▶ Data collected typically describes major work activities, necessary knowledges, skills, and abilities, as well as working conditions.
- ▶ When sound structured interviewing practices are followed, this procedure typically produces valid job data.
- ▶ Structured interviews are standard components of most job analysis practices

Exhibit 6-1 (Continued)
Structured Interviews: Practice Description and Results

There are several techniques that should be incorporated to ensure reliable and valid job data are collected through the interview process. First, the interview should include a structured protocol as well as structured note pages to collect and organize participant input. Next, after the interview is complete, the analyst should immediately spend time organizing his/her notes to clarify key job information. In addition, it is often helpful for the analyst to record the interview with the participant's consent. The recording can be referenced to clarify notes taken in the live interview and serve as documentation. Finally, the analyst should conduct multiple interviews. Interviewing different incumbents and supervisors allows the analyst to cross-check data and identify any inconsistencies among interview responses, which can then be clarified (Gatewood et al., 2008).



Discipline(s)					
 Physical and Occupational Therapy <input checked="" type="radio"/> Yes <input type="radio"/> No	Occupational Health <input checked="" type="radio"/> Yes <input type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input checked="" type="radio"/> Yes <input type="radio"/> No	Human Resources <input checked="" type="radio"/> Yes <input type="radio"/> No	 Ergonomics <input checked="" type="radio"/> Yes <input type="radio"/> No
Quality & Data Considerations					
Level of Detail in Data Collected <input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise Structured interviews allow analysts to collect detailed job information through the direct questioning of incumbents. Data collected typically describe major work activities, necessary KSAs, as well as working conditions (Landau et al., 2003; Rodgers, 1992; U.S. Department of Labor, 1991). While participants can usually provide specific information about their own experiences, it can be difficult for them to be precise in their accounts and/or estimate the experience of other workers. Thus, interviews are typically coupled with other job analysis practices when precise data are needed (Sumer, Sumer, Demirutky, & Cifci, 2001).		Level of Job Performance Measured <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal Analysts are often aggregating information from several sources and viewpoints upon completion of the procedure. It is sometimes the case that participants, even in the same work group, will differ in their accounts of the same activities and/or use different terminology to describe the identical tasks. Thus, using interviews alone, it is difficult to determine the specific level of performance associated with a particular job. In most cases, the analyst gains a solid understanding of the job through interviews that must be refined through additional data collection such as a job questionnaire (Brannick & Levine, 2002; Brannick et al. 2007).		Security of Data <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High Data security is an important issue during structured interviews since the data collected by the analyst may be proprietary and sensitive in nature. For this reason, it is essential that interview notes and recordings be stored securely. When training procedures are followed correctly, security of data is at least moderate under non-extenuating conditions.	

Exhibit 7-1 (Continued)
Structured Interviews: Practice Description and Results

Quality & Data Considerations (Continued)

Validity of Data	Reliability of Data/ Standardization of Procedures	Ease of Data Aggregation
<p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High </p> <p>In all cases, validity is contingent on the strength of the interview questions and probes, the analyst's attention to detail in taking notes, and the willingness of the interviewee to participate. In addition, analyst judgment introduces the possibility of error; however, when sound structured interviewing practices are followed, this procedure typically produces moderately valid job data (Brannick & Levine, 2002; Brannick et al. 2007; Felsberg, 2004; Gael, 1998; Ohio Department of Administrative Services, 2006).</p>	<p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> Complete </p> <p>Interview reliability is dependent on the use of the same structured protocol across administrations (Gael, 1988; Gael, 1990). When strong interview questions and probes are used, reliable results can be expected. However, since participant availability may differ and interruptions may occur, full reliability is not always possible. Analysts must be trained and use good judgment when addressing fluctuations in the interview process.</p>	<p> <input checked="" type="radio"/> Difficult <input type="radio"/> Moderate <input type="radio"/> Easy </p> <p>Data aggregation can be difficult in this procedure since the information provided will not be provided in a standard format. Thus, the analyst must aggregate qualitative data from different sections of the protocol and from different interviews in order to identify, assess, and organize the job data uncovered in a manner that will be useful in subsequent job analysis phases (McPhail et al., 2004).</p>

Exhibit 7-1 (Continued) Structured Interviews: Practice Description and Results					
Data Source(s)					
Incumbents Incumbents are an extremely valuable source of interview data since they have intimate knowledge of their expected performance, daily activities, working conditions, and the jobs required KSAs (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988). It should be cautioned, however, that incumbent data can be biased since the worker may not have a broad perspective of how his/her job fits within the organization and its objectives. Thus, incumbent data should be verified through additional data collections.	Direct Supervisors Direct supervisors are excellent sources of structured interview data and can typically provide valuable information about business processes and performance measures such as production goals, department and organizational procedures, incumbent schedules, emergency guidelines, and company standards (Gael, 1988; McPhail, Jeanneret, McCormick, & Mecham, 2004).			Human Resources Professionals Human Resource professionals are often able to participate in interviews since they have organization-level knowledge of jobs, job activities, and objectives (DuBois, Shalin, Levi & Borman, 1995).	
Target Data Collection Procedure(s)					
Review of Written Mats. <input type="radio"/> Yes <input checked="" type="radio"/> No	Job Observation <input type="radio"/> Yes <input checked="" type="radio"/> No	Survey <input type="radio"/> Yes <input checked="" type="radio"/> No	Interview <input checked="" type="radio"/> Yes <input type="radio"/> No	Focus Groups <input type="radio"/> Yes <input checked="" type="radio"/> No	Assessment of Physical Demands <input checked="" type="radio"/> Yes <input type="radio"/> No
Type of Data Collected					
Task Descriptions Structured interviews will assist a job analyst in identifying required job tasks (Brannick & Levine, 2002; Gael, 1988; Jones et al., 1982; McPhail et al., 2004).	Knowledges, Skills, & Abilities Structured interviews will assist a job analyst in identifying required knowledges, skills and abilities (Brannick & Levine, 2002; Gael, 1988; Jones et al., 1982; McPhail et al., 2004).			Tools, Equipment, & Work Aides Structured interview results will assist an analyst in identifying necessary job tools, equipment, and work aids used by job incumbents (Gael, 1988; Jones et al., 1991; McPhail et al., 2004).	

Exhibit 7-1 (Continued)
Structured Interviews: Practice Description and Results

Type of Data Collected (Continued)

<p align="center">Environmental Conditions/Work Context</p> <p>Using structured interview results, the job analyst can describe the job context, such as physical working conditions, hazards, as well as personal and social aspects of each job (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1991; McPhail et al., 2004).</p>	<p align="center">Physical Demands</p> <p>Interviews can provide information related to the physical demands of the job and/or minimum physical standards (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1982; McPhail et al., 2004; Robinson, 2009).</p>	<p align="center">Training & Educational Requirements</p> <p>Interviews can be used to identify the preferred incumbent education level, required job related experiences and training needed (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1982; McPhail et al., 2004).</p>
<p align="center">Cognitive Demands</p> <p>Interview results can allow an analyst to assess and describe cognitive demands, such as information processing activities, short-term memory and time pressure (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004; Robinson, 2009).</p>	<p align="center">Other Types of Data Collected</p> <p>Results of a structured interview can produce data related to work schedules, peak performance levels, travel, compensation, and other important job requirements (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1982; McPhail et al., 2004).</p>	
<p align="center">Resources Needed</p>		
<p align="center">Length of Time to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (less than 1 month) <input type="radio"/> Medium (1 to 6 months) <input type="radio"/> Long (6 months or longer) <p>The interview procedure involves the development of a structured protocol and note pages (Gael, 1988; Gael, 1990). This process is straightforward and well-documented and can typically be completed in less than one month.</p>	<p align="center">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>Structured interview development cost is typically low since it only necessitates the analyst's time. In addition, all activities can be completed using a standard word processor (Gael, 1988; Gael, 1990).</p>	

Exhibit 7-1 (Continued)
Structured Interviews: Practice Description and Results

Resources Needed (Continued)

<p align="center">Length of Time to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (less than 2 hours) <input type="radio"/> Medium (2 hours to 5 hours) <input type="radio"/> Long (5 hours or longer) <p>Depending on availability of participants, interviews typically last between 1 and 2 hours per administration. Since interviews typically involve multiple administrations, overall administration time may be medium.</p>	<p align="center">Monetary Cost to Administer</p> <ul style="list-style-type: none"> <input type="radio"/> Inexpensive <input checked="" type="radio"/> Moderate <input type="radio"/> Expensive <p>There is no expensive equipment used and little additional resources beyond analyst time are needed per administration. However, since interviews typically involve multiple administrations, overall administration cost may be expensive.</p>
Data Documenting Resource(s)	
<p align="center">Structured Interview Protocol</p> <p>A standardized interview protocol with job-related questions should be developed for the specific purposes of the job analysis being conducted. This protocol should be used across every administration to ensure reliability and increase validity of data collected (Jones et al., 1982; McPhail et al., 2004).</p>	<p align="center">Hard Copy/Structured Note Pages</p> <p>Hard copy notes should be taken during the structured interview process in order to inform subsequent data collection (Jones et al., 1982; McPhail et al., 2004).</p>
Additional Resource(s) Needed	
<p align="center">Meeting Space</p> <p>The job analyst may meet with stakeholders at the job site or a previously-designated meeting space to gather materials and securely transfer files (McPhail et al., 2004).</p>	<p align="center">Access to Workspace</p> <p>If a face-to-face interview that includes a workspace tour, the job analyst must be given access to the workspace in which the job normally occurs (Jones et al., 1991; McPhail et al., 2004; Robinson, 2009).</p>





Exhibit 7-1 (Continued)	
Structured Interviews: Practice Description and Results	
 Pros/Cons	
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Allows job analyst to learn about the job, improve understanding of key job details, and refine future data collections (Biddle, 2009; Brannick & Levine, 2002; Brannick et al, 2007; Clifford, 2001; Gael, 1988; Peterson et. al., 2001; Jones et al., 1982) ▶ Requires few resources (Gael, 1988) ▶ Very flexible data collection procedure that can be applied to all jobs (Gael, 1988) ▶ Research-supported procedure (Biddle, 2009; Brannick & Levine, 2002; Brannick et al, 2007; Clifford, 2001; Gael, 1988; Jones et al., 1982; Peterson et. al., 2001) 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Interviews are dependent on the availability of experienced participants, which can vary in their ability to summarize key job details (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988) ▶ Requires judgment on part of analyst since each participant will provide only some of the job information required and qualitative results must be aggregated across administrations (Brannick et al, 2007; Clifford, 2001; Gael, 1988; Jones et al., 1982)
 Expert Evaluation	
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely <p>▶ Structured interviews are widely used for job analysis. Their use is supported by research, and they have been repeatedly upheld as a legally defensible practice.</p> <p>▶ Structured interviews allow job analysts to explore the intricacies of the job.</p>	<ul style="list-style-type: none"> ▶ Interviews provide a flexible and widely applicable way to gather qualitative data. Skillfully conducted interviews can also assist in eliminating biases. ▶ When combined with additional data collection techniques, the structured interview procedure is a legally defensible job analysis procedure that serves a critical role in most job analysis models and practices (Biddle, 2009; Brannick & Levine, 2002; Brannick et al, 2007; Clifford, 2001; Gael, 1988; Heron, 2005; Jones et al., 1982; OHCOW, 2011; Ohio Department of Administrative Services, 2006; Peterson et. al., 2001; U.S. Department of Labor 1991).
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ While interview data can be valid, this is dependent on factors such as quality of the SME, the protocol, and the analyst's interviewing skills.</p>	<p>▶ When a standardized protocol is used, it is likely that interview data will be reliable.</p>

Exhibit 7-1 (Continued)
Structured Interviews: Practice Description and Results



Expert Evaluation (Continued)	
	
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p>	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p>
<p>▶ Structured interviews are widely employed in established job analysis models and are considered a strong method of gathering data.</p>	<p>▶ Analysts can easily be trained to follow a structured interview protocol and learn basic interviewing skills.</p>
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p>
<p>▶ Steps to ensure confidentiality can be implemented, such as requiring analysts to sign a confidentiality document for each organization.</p>	<p>▶ Structured interviews are can be conducted in-person or over the phone (which would reduce travel costs).</p> <p>▶ Structured interviews can be conducted relatively quickly.</p>
<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p>	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p>
<p>▶ Due to the flexibility of the interview procedure, it should be possible to conduct structured interviews for all jobs in the U.S. labor market.</p>	<p>▶ The level of granularity in interview data can be tailored by adjusting the specificity of the interview protocol.</p>

Exhibit 7-1 (Continued)
Structured Interviews: Practice Description and Results



Expert Evaluation (Continued)



Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

▶ As long as contextual information is addressed in the protocol, it is easy to collect task and work activity data from SMEs during structured interviews.

▶ As long as KSA information is addressed in the protocol, it is easy to collect this data from SMEs during structured interviews.

Chapter 8: Focus Groups

This chapter provides a summary of focus groups as a job analysis data collection procedure. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. This chapter summarizes focus groups as a general data collection procedure that can be used alone or in combination with other data collection procedures in conducting successful job analyses.

Exhibit 8-1 Focus Groups: Practice Description and Results

A traditional method for job analysts to collect data is through a focus group. The most common participants for a focus group are incumbents, supervisors, or other subject matter experts (SMEs), all of which should be extremely familiar with the job being analyzed (Ohio Department of Administrative Services, 2006). Similar to interviews, a focus group allows job analysts to collect a variety of data, from simple to highly-complex and detailed data, by asking several job experts questions about the job and what type of individual it might take to perform the work tasks and functions (Campbell & Kuncel, 2001). However, depending on the purpose of the job analysis, a focus group may be more time-efficient and cost-efficient than interviews because it can be used to gather data from multiple sources concurrently. As a result, analysts opt for focus groups when there is a need for a quick turnaround (Brannick & Levine, 2002; Brannick, Levine, & Morgeson, 2007; Clifford, 2001; Singh, 2008). Although it may be difficult to coordinate with every participant's schedule, another benefit of a focus group is its ability to generate synergy if the participants are at the same technical or organizational level (Singh, 2008). Since the analyst facilitates the focus group, he/she is able to clarify questions if answers are not understood (Brannick et al., 2007; Fine & Cronshaw, 1999). Additionally, the group interaction provides an immediate validation of the data gathered.

A qualified and skilled analyst is one of the most important components of an effective focus group. Since all participants are present, the group can easily get off the topic if not facilitated properly. To help minimize distractions, the participants should be provided with an agenda prior to the meeting. The analyst should also provide participants with a concise background of the project, told why they are invited, informed of the goals of the meeting, and be guaranteed anonymity upon request (Training Interview Participant, SSA Call Order 2). Furthermore, the analyst should have all the participants introduce themselves before asking specific questions about the job (Clifford, 2001). These procedures help establish a strong rapport with participants and create a level of trust, which is necessary for collecting honest and accurate data.

Job Analysis Practice Highlights

- ▶ Reliable and efficient method to collect data from multiple subject matter experts.
- ▶ Involves group interaction, which allows for immediate validation of the data gathered.
- ▶ Questions and follow up probes are easily tailored to the job analysis purpose and model selected.
- ▶ Data collected typically describes major work activities, necessary knowledges, skills, and abilities, as well as working conditions.
- ▶ Used primarily in Industrial/Organizational Psychology, but also applied in other disciplines including Physical and Occupational Therapy, Occupational Health, Vocational Rehabilitation, Human Resources, and Ergonomics.

Exhibit 8-1 (Continued)

Focus Groups: Practice Description and Results

During the focus group, it is critical that the analyst document the participants' responses. Documentation serves to clarify understanding and prevents the need to return to a participant for data already covered. Good documentation can also be reviewed over and over until the analyst achieves adequate understanding. Furthermore, documentation allows other analysts to pick up where the first left off, should he/she be reassigned. Lastly, and perhaps most importantly, documentation creates the record of the discussion that can be referred to at some later date and can serve as the basis for future work and decisions (Biddle, 2009; Jones, Steffy, & Bray, 1991). To ensure the collection of accurate, reliable, and valid data, the analyst should provide his/her notes to focus group participants to review (Biddle, 2009; Fine & Cronshaw, 1999).



Discipline(s)					
 Physical and Occupational Therapy <input checked="" type="radio"/> Yes <input type="radio"/> No	Occupational Health <input checked="" type="radio"/> Yes <input type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input checked="" type="radio"/> Yes <input type="radio"/> No	Human Resources <input checked="" type="radio"/> Yes <input type="radio"/> No	 Ergonomics <input checked="" type="radio"/> Yes <input type="radio"/> No
Quality & Data Considerations					
Level of Detail in Data Collected <input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise Depending on the information necessary to complete the job analysis, the analyst is capable of collecting general, moderate, or precise information about the job (Campbell & Kuncel, 2001). If precise information is required, then the analyst should be skilled in asking the right questions and probing in order to collect the level of detail in the data. Typically, the data collected describe major work activities, necessary knowledges, skills, and abilities, as well as working conditions (U.S. Department of Labor, 1991; Landau, Brauchler, & Rohmert, 2003).		Level of Job Performance Measured <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal The level of job performance measured may vary depending on the purpose of the job analysis. Furthermore, the analyst is often compiling data collected from several sources with different perspectives of the job. For example, a supervisor may provide unique information that is not reflected in the data provided by an incumbent performing at the average level. As a result, it is important for the analyst facilitating the focus group to ask participants to differentiate between different levels of performance (i.e., specifically ask for information on minimal, average, or maximal performers) (Brannick & Levine, 2002; Brannick et al. 2007).		Security of Data <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High The security of data is an important issue during focus groups since participants are asked to share information that may be proprietary and sensitive in nature. For this reason, it is essential for analyst to securely store any notes and recordings. When training procedures are followed correctly, security of data is at least moderate under non-extenuating conditions.	

Exhibit 8-1 (Continued)
Focus Groups: Practice Description and Results

Quality & Data Considerations (Continued)

Validity of Data	Reliability of Data/ Standardization of Procedures	Ease of Data Aggregation
<p>○ Low <input checked="" type="radio"/> Moderate ○ High</p> <p>In all cases, data validity is contingent on the analyst's skills in facilitating focus groups. The most successful focus groups result from an analyst skilled in developing clear and appropriate questions and probes, listening and communicating, paying attention to detail in taking notes. Additionally, a successful focus group relies on the participants' willingness to be interviewed in a group setting and provide honest and accurate information. However, even if a focus group protocol is used, there is moderate level of analyst judgment necessary when facilitating (e.g., when to ask or ignore prompt questions, when and how to steer the discussion when it gets off-topic), as well in data aggregation and analysis since focus group data are primarily qualitative. Therefore, when sound focus group practices are followed, this procedure typically produces moderately valid job data (Brannick & Levine, 2002; Brannick et al. 2007; Gael, 1998; Ohio Department of Administrative Services, 2006).</p>	<p>○ Low <input checked="" type="radio"/> Moderate ○ Complete</p> <p>Data reliability is dependent on the use of the same structured protocol across focus group administrations (Gael, 1988). When strong focus group questions and probes are used, reliable results can be expected. However, the availability of subject matter experts may differ and interruptions may occur. As a result, it is not always possible to achieve full reliability. Analysts must be trained in facilitating and use good judgment when addressing fluctuations in the focus group process.</p>	<p><input checked="" type="radio"/> Difficult ○ Moderate ○ Easy</p> <p>Data aggregation can be difficult in this procedure since the information is often qualitative and is not provided in a standard format. Thus, the analyst must aggregate qualitative data from different sections of the protocol and from different focus groups in order to identify, assess, organize and then synthesize the job data uncovered in a manner that will be useful in subsequent job analysis phases (McPhail, Jeanneret, McCormick, & Mecham, 2004).</p>

Exhibit 8-1 (Continued)
Focus Groups: Practice Description and Results

Exhibit 8-1 (Continued)					
Focus Groups: Practice Description and Results					
Data Source(s)					
<p style="text-align: center;">Incumbents</p> <p>Incumbents are an extremely valuable resource for focus group data since they are often the most experienced in performing the various elements. Job incumbents have intimate knowledge of their expected performance, daily activities, working conditions, and the job’s required KSAs. Incumbents who are selected to participate should have at least six months or one year of experience in the job and should have demonstrated successful performance on the job (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1991).</p>	<p style="text-align: center;">Direct Supervisors</p> <p>Direct supervisors may also be relied on for focus group data collection. Typically, supervisors will provide a different perspective than incumbents performing the job. Thus, supervisors are often placed into a separate focus group to provide valuable information about business processes and performance measures, such as production goals, department and organizational procedures, incumbent schedules, emergency guidelines, and company standards (Gael, 1988; McPhail et al., 2004).</p>	<p style="text-align: center;">Human Resource Professionals</p> <p>Human Resource professionals and other subject matter experts (SMEs) are often able to participate in focus groups since they have organization-level knowledge of jobs, job activities, and objectives. It is important that those who participate in the focus group are extremely familiar with the job being analyzed (Ohio Department of Administrative Services, 2006).</p>			
Target Data Collection Procedure(s)					
<p>Review of Written Mats.</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Job Observation</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Survey</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Interview</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Focus Groups</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Assessment of Physical Demands</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>

Exhibit 8-1 (Continued)
Focus Groups: Practice Description and Results




Exhibit 8-1 (Continued)		
Focus Groups: Practice Description and Results		
Type of Data Collected		
 <p>Task Descriptions</p> <p>Focus groups will assist a job analyst in identifying required job tasks, such as what a worker does (i.e., the procedures and processes engaged in by a worker as a task is performed), as well as why and how the task is performed (Biddle, 2009; Clifford, 2001; Jones et al., 1991; McPhail et al., 2004; Gael, 1988; Gatewood et al., 2008; Brannick & Levine, 2002; Brannick et al., 2007; Ohio Department of Administrative Services, 2006; Fine & Cronshaw, 1999; U.S. Dept. of Energy, 1994).</p>	 <p>Knowledges, Skills & Abilities</p> <p>Focus groups will assist a job analyst in identifying required knowledges, skills and abilities (Biddle, 2009; Clifford, 2001; Jones et al., 1991; McPhail et al., 2004; Gael, 1988, Brannick & Levine, 2002; Brannick et al., 2007; Gatewood et al., 2008; Ohio Department of Administrative Services, 2006; Fine & Cronshaw, 1999).</p>	 <p>Tools, Equipment, & Work Aides</p> <p>Focus groups results will assist an analyst in identifying necessary job tools, machines, office equipment, safety gear/clothing and work aids used by job incumbents (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Ohio Department of Administrative Services, 2006; Gael, 1988; Jones et al., 1991; McPhail et al., 2004).</p>
<p>Worker Functions</p> <p>Worker functions are primarily collected when the Functional Job Analysis (FJA) model is applied to the job analysis and refers specifically to people, data, and/or things that are of importance to the job. Focus groups allow participants to share insights and experiences performing various work functions. Although focus group participants may have the same job titles, they may provide different accounts of the same activities (Brannick & Levine, 2002; Brannick et al., 2007; Gatewood et al., 2008; Gael, 1988; Fine & Cronshaw, 1999).</p>	<p>Environmental Conditions/Work Context</p> <p>Using focus group results, the job analyst can describe the job context, such as physical working conditions, hazards, as well as personal and social aspects of each job (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1991; McPhail et al., 2004).</p>	<p>Importance/Frequency of Activities</p> <p>Analysts can collect data on the importance and/or frequency of job activities. This information can assist the analyst in identifying the critical elements of the job (Brannick & Levine, 2002; Brannick et al., 2007; Clifford, 2001; Gael, 1988; Ohio Department of Administrative Services, 2006; Jones et al., 1991; McPhail et al., 2004; U.S. Dept. of Energy, 1994).</p>

Exhibit 8-1 (Continued)
Focus Groups: Practice Description and Results

Exhibit 8-1 (Continued) Focus Groups: Practice Description and Results		
Type of Data Collected (Continued)		
<p align="center">Training & Educational Requirements</p> <p>Focus groups can be used to identify the preferred incumbent education level, required job-related experiences, and training needed (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1991; McPhail et al., 2004; U.S. Dept. of Energy, 1994).</p>	<p align="center">Minimum Entry Qualifications</p> <p>Focus group participants may be asked about the minimum entry qualifications, such as any certificates or licenses that are required before entering the job or necessary to perform a task (Brannick & Levine, 2002; Brannick et al., 2007; Gatewood et al., 2008; Ohio Department of Administrative Services, 2006;).</p>	<p align="center">Personality Characteristics</p> <p>Focus group participants may be asked to identify any personal characteristics (e.g., conscientiousness, emotional stability, reliability, dependability, and integrity) that are ideal for a job incumbent to possess (Ohio Department of Administrative Services, 2006; Brannick & Levine, 2002; Brannick et al., 2007; Gatewood et al., 2008).</p>
<p align="center">Physical Demands</p> <p>Focus groups can provide information related to the physical demands of the job and/or minimum physical standards, such as ability to see, hear, walk, carry items, and balance (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1991; McPhail et al., 2004; Robinson, 2009).</p>	<p align="center">Cognitive Demands</p> <p>Focus group results can allow an analyst to assess and describe cognitive demands, such as information processing activities, short-term memory and time pressure (Biddle, 2009; Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004).</p>	<p align="center">Other Types of Data Collected</p> <p>Results from focus groups can produce data related to work schedules, peak performance levels, travel, compensation, and other important job requirements. Focus group participants may also be asked to describe what the job may entail in the future (i.e., what and how it will be different) (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Jones et al., 1991; McPhail et al., 2004; Singh, 2008; Fine & Cronshaw, 1999).</p>
Resources Needed		
<p align="center">Length of Time to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (e.g., less than 1 month) <input type="radio"/> Medium (e.g., 1 to 6 months) <input type="radio"/> Long (e.g., 6 months or longer) <p>The focus group procedure involves the development of a structured protocol and note pages (Gael, 1988). This process is straightforward and well-documented and can typically be completed in less than a month.</p>	<p align="center">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>Development costs associated with facilitating a focus group is typically low since it only necessitates the analyst's time. All activities can be completed using a standard word processor (Gael, 1988).</p>	

Exhibit 8-1 (Continued)
Focus Groups: Practice Description and Results

Resources Needed (Continued)

Exhibit 8-1 (Continued) Focus Groups: Practice Description and Results	
Resources Needed (Continued)	
<p align="center">Length of Time to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (e.g., less than 2 hours) <input type="radio"/> Medium (e.g., 2 hours to 5 hours) <input type="radio"/> Long (e.g., 5 hours or longer) <p>Depending on availability of participants, focus groups typically last between 1 and 2 hours per administration. Since the analysis might require multiple focus groups to accommodate participants at different levels, overall administration time may be medium.</p>	<p align="center">Monetary Cost to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>There is no expensive equipment used and little additional resources beyond the analyst and participants' time are needed per administration. However, a job analysis that requires multiple focus groups administrations will increase the costs for administration.</p>
Data Documenting Resource(s)	
<p align="center">Structured Focus Group Protocol</p> <p>A standardized focus group protocol with job-related questions should be developed for the specific purposes of the job analysis being conducted. This protocol should be used across every administration of participants in the same role to ensure reliability and increase validity of data collected. Other protocols may be necessary for focus groups with supervisors or Human Resources staff (Jones et al., 1991; McPhail et al., 2004).</p>	<p align="center">Hard Copy/Structured Note Pages</p> <p>Hard copy notes should be taken during the focus groups in order to inform subsequent data collection. (Gatewood et al., 2008; Gael, 1988; Jones et al., 1991; McPhail et al., 2004; Fine & Cronshaw, 1999; Jones et al., 1991; Ohio Department of Administrative Services, 2006).</p>
<p align="center">Voice Recorder</p> <p>Analysts may find it helpful to record the focus group discussions to ensure accurate and complete data collection. Audio recordings are valuable resources for analysts to use and reference for context and understanding (Gael, 1988; U.S. Dept. of Energy, 1994).</p>	<p align="center">Computer Software</p> <p>Computer software may be used by analysts to enter focus group data directly into the computer (Clifford, 2001). In some techniques such as the Delphi Focus Group Method, a computer may also be used collect participant responses before discussion begins for each question. The Delphi Method establishes an opinion or view among participants by having them independently respond to each question using a 'voting' mechanism (e.g., yes/no card, written response, electronic survey), then focus group discussion centers conflicting opinions or views. The goal of this Delphi Method is continual evolution towards 'oneness of mind', or consensus on the opinion or view of job requirements (Sackman, 1974).</p>

Exhibit 8-1 (Continued)
Focus Groups: Practice Description and Results

Exhibit 8-1 (Continued) Focus Groups: Practice Description and Results	
Resources Needed (Continued)	
<i>Additional Resource(s) Needed</i>	
<p align="center">Meeting Space</p> <p>The job analyst may meet with focus group participants at the job site or a previously-designated meeting space to gather materials and securely transfer files. This meeting space should be removed from the everyday workplace to avoid distractions (Gatewood et al., 2008; Jones et al., 1991; Fine & Cronshaw, 1999; McPhail et al., 2004; U.S. Dept. of Energy, 1994).</p>	<p align="center">Overhead Projector/Large Notepad on Easel</p> <p>The analyst should record the notes on a large pad or easel visible to all participants during the meeting or they can be recorded on a structured note page designed to input data related to specific questions (Fine & Cronshaw, 1999).</p>
<p align="center">Computer</p> <p>The job analyst may also enter focus group data directly into the computer. A computer print-out of the initial focus group data can be distributed to everyone in the job and reviewed for accuracy (Clifford, 2001).</p>	<p align="center">Telephone Access</p> <p>If face-to-face focus groups are not possible due to limited time or resources, telephone access is needed to administer the focus group via a teleconference phone-line (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988; Gatewood et al., 2008; Fine & Cronshaw, 1999).</p>
Pros/Cons	
<p align="center">Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Capable of saving time and reducing costs because it can be used to gather data from multiple sources concurrently (Brannick & Levine, 2002; Brannick et al, 2007; Clifford, 2001; Singh, 2008) ▶ Research-supported data gathering procedure, shown to collect reliable and valid data (Biddle, 2009; Brannick & Levine, 2002; Brannick et al, 2007; Clifford, 2001; Fine & Cronshaw, 1999; Gael, 1988, Jones et al., 1991) ▶ Features easily adaptable to apply to almost all jobs (Gael, 1988) ▶ Capable of collecting a variety of data, from simple to highly-complex and detailed data (Gael, 1988) 	<p align="center">Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Dependent on the availability of experienced participants, which can vary in their ability to summarize key job details and may be challenging to coordinate with every participant's schedule (Brannick & Levine, 2002; Brannick et al., 2007; Gael, 1988) ▶ Successful data collection depends on the analyst's ability to facilitate the focus group, probe with the appropriate questions, and accurately document the responses (Biddle, 2009; Brannick & Levine, 2002; Brannick et al, 2007; Singh, 2008) ▶ Participants may not be honest or provide complete data since they are surrounded by their coworkers (Brannick & Levine, 2002; Brannick et al, 2007)

Exhibit 8-1 (Continued)
Focus Groups: Practice Description and Results



Pros/Cons (Continued)



Positive Aspects of Practice

- ▶ Requires few resources (Gael, 1988)
- ▶ Able to generate synergy if the participants are at the same technical or organizational level (Singh, 2008)
- ▶ Analyst is easily able to clarify questions if answers are not understood, while the group interaction also provides an immediate validation of the data gathered (Jones et al., 1991; Biddle, 2009)

Negative Aspects of Practice

- ▶ May be difficult to thoroughly document participants' responses, but done easily with additional resources, such as an audio recorder or note-taker (Gael, 1988; U.S. Dept. of Energy, 1994)
- ▶ Relying on focus group tape recordings for data has drawbacks, since the equipment could malfunction (Gael, 1988)
- ▶ It may be difficult to gather sufficient groups of incumbents or supervisors in smaller organizations; thus, additional steps may need to be taken to ensure small organizations are represented in the data collection (e.g., combining SMEs from multiple locations in a phone focus group)
- ▶ It may be difficult to gather SMEs with varying perspectives; steps should be taken to ensure a diverse group of participants.



Expert Evaluation



Likelihood Practice will Be Legally Defensible

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ Research has shown that focus groups collect reliable and valid data (Biddle, 2009; Brannick & Levine, 2002; Brannick et al, 2007; Clifford, 2001; Fine & Cronshaw, 1999; Gael, 1988, Jones et al., 1991)
- ▶ To be legally defensible, care should be taken to ensure that a representative sample is used in the focus groups, that the choice of focus group participants is documented, and that a structured protocol is used.

Exhibit 8-1 (Continued)
Focus Groups: Practice Description and Results





 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Focus group data is likely to be valid; however, participants must be carefully selected. For example, participants may be hesitant to share their true thoughts if there are supervisors present, a very large focus group, or people from different groups (e.g., union employees and management).</p>	<p>▶ Focus group data is likely to be reliable; however, care must be taken to ensure that the group is representative and that a structured protocol is used.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Focus groups are widely employed in established job analysis models and are considered a strong method of gathering data.</p>	<p>▶ While the basics of focus group facilitation can be taught easily, it takes practice to build strong facilitation skills, and it may be difficult to maintain consistency among analysts.</p>
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ Steps to ensure confidentiality can be implemented, such as requiring analysts to sign a confidentiality document for each organization.</p>	<p>▶ Focus groups gather data from multiple SMEs during the same session, increasing their efficiency.</p> <p>▶ Focus groups can be conducted in person or over the phone.</p>

Exhibit 8-1 (Continued)
Focus Groups: Practice Description and Results

 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ While the focus group methodology can be applied to any occupation, it may be difficult to gather sufficient groups of incumbents or supervisors in smaller organizations. Additional steps may need to be taken to ensure small organizations are represented in the data collection (e.g., combining SMEs from multiple locations in a phone focus group).</p>	<p>▶ The level of granularity in focus group data can be tailored by adjusting the specificity of the protocol.</p>
<p>Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ As long as contextual information is addressed in the protocol, it is easy to collect task and work activity data from SMEs during focus groups.</p>	<p>▶ As long as KSA information is addressed in the protocol, it is easy to collect this data from SMEs during focus groups.</p>

Chapter 9: Instrument Measurement of Physical Demands

This chapter provides a summary of the measurement of physical demands as a job analysis data collection procedure. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. Although specific instruments are discussed as examples, this chapter summarizes the measurement of physical demands as a general data collection procedure that can be used alone or in combination with other data collection procedures in conducting successful job analyses. As such, all data categories in this chapter (e.g., Quality and Data Considerations, Data Sources) provide an overarching assessment of 'Instrument Measurement' as a procedure and do not refer to (or assess) any one instrument unless clearly specified.

Exhibit 9-1

Instrument Measurement of Physical Demands: Practice Description and Results

Instrument measurement of physical demands refers to job analysis data collection procedures that involve taking measurements from job incumbents in an effort to assess the physical demands of the job. While physical demands are often inferred through other data collection procedures (e.g., observing or interviewing incumbents and then making ratings), this procedure is defined by the use of measuring devices to take more objective, quantitative measurements. These measurements are generally taken during an on-site job observation (Jacobs, 1997; Keyserling, Armstrong, & Punnett, 1991; Martinko, 1988; Matheson, 2010; OHCOW, n.d.; Perez, 2006; Rodgers, 1992).

Instrument measurement of physical demands tends to be most common within the discipline of Ergonomics (e.g., Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010; Perez, 2006); however, it is also used in Physical and Occupational Therapy, Occupational Health, and Vocational Rehabilitation (e.g., Jacobs, 1997; Occupational Health Clinics for Ontario Workers Inc. (OHCOW), n.d.; Rogers, 1992). According to this procedure, the specific physical motion or burden of incumbents is measured. For example, this may involve measuring the amount of force workers must exert, the amount of weight they must lift, the dimensions of their posture, the range of motion they must use, the amount of vibration to which they are subjected, or the amount of repetition required by their work. Depending on the objectives of the job analysis, data may be collected using any of a variety of different measuring devices, such as pressure gauges, spring scales, electromyography equipment, goniometers, torsionometers, motion capture systems, thermometers, tape measures, and stopwatches. Photo or video cameras may be used to capture the motion for subsequent measurement and/or to retain a record of the job (Jacobs, 1997; Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010). While specific instruments such as these can be used to collect data regarding the physical demands of a job, this chapter focuses on the overarching procedure of using instruments to measure physical demands.

The instrument measurement of physical demands typically results in a number of advantages, including the precise nature of the collected data, high reliability, high validity, and data that are typically easy to aggregate. Conversely, such detailed measurement procedures can be time consuming and resource intensive, result in a large quantity of data that may be difficult to manage, can be intrusive to incumbents, and often involve the use of complex measuring devices that require technical training (Lowe & Kreig, 2009; Matheson, 2010).

Job Analysis Practice Highlights

- ▶ Collects precise data on physical demands from incumbents
- ▶ A variety of measuring devices may be used, such as such as pressure gauges, spring scales, electromyography equipment, goniometers, torsionometers, dynamometers, motion capture systems, thermometers, tape measures, and stop watches.
- ▶ Used in Ergonomics, Physical and Occupational Therapy, Occupational Health, and Vocational Rehabilitation

Exhibit 9-1 (Continued) Instrument Measurement of Physical Demands: Practice Description and Results					
Discipline(s)					
Physical and Occupational Therapy <input checked="" type="radio"/> Yes <input type="radio"/> No	Occupational Health <input checked="" type="radio"/> Yes <input type="radio"/> No	Industrial/Organizational Psychology <input type="radio"/> Yes <input checked="" type="radio"/> No	Vocational Rehabilitation <input checked="" type="radio"/> Yes <input type="radio"/> No	Human Resources <input type="radio"/> Yes <input checked="" type="radio"/> No	Ergonomics <input checked="" type="radio"/> Yes <input type="radio"/> No
Quality & Data Considerations					
Level of Detail in Data Collected <input type="radio"/> General <input type="radio"/> Moderate <input checked="" type="radio"/> Precise Precise measurements are collected on the physical demands of the job, which may include measurements such as force, posture, motion, vibration, or repetition. While the specific data collected vary with the purpose and needs of the individual job analysis, measurements are often taken on different parts of the body, in different postures, when performing different tasks, and so forth, and thus, result in a large quantity of detailed data (Jacobs, 1997; Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010).		Level of Job Performance Measured <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal Measurements are usually collected from typical incumbents to gather data on the physical demands that are generally experienced on the job. Thus, data tend to be representative of typical job performance (Jacobs, 1997; Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010).		Security of Data <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High Security of data depends on the specific procedures that are selected. Security can be high when computerized data acquisition is used (e.g., Matheson, 2010) or low when measurements are recorded in hard copy (e.g., Lowe & Kreig, 2009). On average, data security is moderate.	

Exhibit 9-1 (Continued) Instrument Measurement of Physical Demands: Practice Description and Results					
Quality & Data Considerations (Continued)					
<p style="text-align: center;">Validity of Data</p> <p> <input type="radio"/> Low <input type="radio"/> Moderate <input checked="" type="radio"/> High </p> <p>Because this data collection procedure involves the use of measurement instruments, typical data tend to be high in accuracy and do not involve subjective judgments made by the job analyst (Bao, Spielholz, Howard, & Silverstein, 2006; Jacobs, 1997; Jones & Kumar, 2007; Ketola, Toivonen, & Viikari-Juntura, 2001; Keyserling et al., 1991; Lowe, 2004; Lowe & Kreig, 2009; Matheson, 2010; Spielholz, Silverstein, Morgan, Checkoway, & Kaufman, 2001).</p>	<p style="text-align: center;">Reliability of Data/ Standardization of Procedures</p> <p> <input type="radio"/> Low <input type="radio"/> Moderate <input checked="" type="radio"/> Complete </p> <p>Use of measurement devices helps to ensure that the collected data are reliable. While job analyses may vary in terms of the specific measurements that need to be gathered, each set of measurements is taken using a standardized approach so that data are comparable across jobs. The high reliability of this procedure refers to typical, overarching ratings and not the individual instruments used to take measurements (Jacobs, 1997; Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010).</p>	<p style="text-align: center;">Ease of Data Aggregation</p> <p> <input type="radio"/> Difficult <input type="radio"/> Moderate <input checked="" type="radio"/> Easy </p> <p>This data collection procedure involves collecting quantitative measurements. Although in some cases a large quantity of data are gathered that may be difficult to manage, on average, the data resulting from physical demands measurement tend to be relatively easy to aggregate (Jacobs, 1997; Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010).</p>			
Data Source(s)					
<p>Incumbents</p> <p>Measurements of physical demands are taken directly from incumbents, as this is the best way to capture the physical demands as they are actually experienced on the job (Jacobs, 1997; Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010).</p>					
Target Data Collection Procedure(s)					
<p>Review of Written Mats.</p> <p> <input type="radio"/> Yes <input checked="" type="radio"/> No </p>	<p>Job Observation</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>	<p>Survey</p> <p> <input type="radio"/> Yes <input checked="" type="radio"/> No </p>	<p>Interview</p> <p> <input type="radio"/> Yes <input checked="" type="radio"/> No </p>	<p>Focus Groups</p> <p> <input type="radio"/> Yes <input checked="" type="radio"/> No </p>	<p>Assessment of Physical Demands</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>

Exhibit 9-1 (Continued) Instrument Measurement of Physical Demands: Practice Description and Results	
Type of Data Collected	
<p>Physical Demands</p> <p>Physical demands are the focus of this data collection procedure. The specific data vary depending on the focus of the job analysis and may include demands such the amount of force workers must exert, the amount of weight they must lift, the dimensions of their posture, the range of motion they must use, the amount of vibration to which they are subjected, or the amount of repetition required by their work (Jacobs, 1997; Jones & Kumar, 2007; Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010; OHCOW, n.d.; Perez, 2006; Rodgers, 1992).</p>	
Resources Needed	
<p style="text-align: center;">Length of Time to Develop</p> <ul style="list-style-type: none"> <input type="radio"/> Short (e.g., less than 1 month) <input type="radio"/> Medium (e.g., 1 to 6 months) <input checked="" type="radio"/> Long (e.g., 6 months or longer) <p>Measurement of physical demands can involve greater technical complexity than most other procedures, leading to a lengthy development period (Lowe & Kreig, 2009).</p>	<p style="text-align: center;">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input type="radio"/> Inexpensive <input type="radio"/> Moderate <input checked="" type="radio"/> Expensive <p>Preparation for this data collection procedure can be expensive when it involves the purchase of technical equipment (Lowe & Kreig, 2009).</p>
<p style="text-align: center;">Length of Time to Administer</p> <ul style="list-style-type: none"> <input type="radio"/> Short (e.g., less than 30 min) <input type="radio"/> Medium (e.g., 30 min to 2 hours) <input checked="" type="radio"/> Long (e.g., 2 hours or longer) <p>Information collected is very precise and may take a significant amount of time to collect (Lowe & Kreig, 2009).</p>	<p style="text-align: center;">Monetary Cost to Administer</p> <ul style="list-style-type: none"> <input type="radio"/> Inexpensive <input type="radio"/> Moderate <input checked="" type="radio"/> Expensive <p>Use of physical demands measurement equipment can be expensive (Lowe & Kreig, 2009).</p>

Exhibit 9-1 (Continued)		
Instrument Measurement of Physical Demands: Practice Description and Results		
Resources Needed (Continued)		
Data Documenting Resource(s)		
Goniometer Goniometers are often used to measure angles, such as flexion/extension of the limbs or measurement of static postures (Keyserling et al., 1991; Jones & Kumar, 2007; Lowe & Kreig, 2009; Matheson, 2010; Perez, 2006).	Pressure Gauge Pressure gauges or dynamometers may be used to measure force exerted by incumbents (Jacobs, 1997; Matheson, 2010; OHCOW, n.d.; Perez, 2006; Rodgers, 1992).	Video Recorder Video recorders are frequently employed to maintain a record of the incumbent's motion or for subsequent, more detailed analysis than can be accomplished on site (Jacobs, 1997; Jones & Kumar, 2007; Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010; Perez, 2006; Rodgers, 1992).
Camera Cameras may be used to capture images for subsequent analysis; for example, still images are useful for measuring the worker's posture (Jacobs, 1997; Keyserling et al., 1991; Matheson, 2010; OHCOW, n.d.; Perez, 2006).	Scale Scales, such as spring scales, may be used to measure the weight of objects held, as well as push and pull forces that are exerted (Jacobs, 1997; Keyserling et al., 1991; Martinko, 1988; Matheson, 2010; OHCOW, n.d.).	Tape Measure A tape measure may be used to determine lift and reach distances or carrying distances (Jacobs, 1997; Keyserling et al., 1991; OHCOW, n.d.).
Stopwatch A stopwatch may be used to record the length of time a physical action is sustained (Jacobs, 1997; Keyserling et al., 1991; OHCOW, n.d. ; Perez, 2006).	Electromyography Equipment Electromyography equipment is sometimes used to measure internal muscle forces (Jones & Kumar, 2007; Lowe & Kreig, 2009; Matheson, 2010).	Thermometer Thermometers may be used to capture ambient temperature (Matheson, 2010).
Torsiometer Torsiometers can be used to measure limb rotation (Lowe & Kreig, 2009).	Motion Capture System Motion capture systems, such as 3-D optical motion capture, may be used to measure kinematics (Lowe & Kreig, 2009).	Hard Copy/Structured Note Pages Structured note pages may be used when gathering hard copy data (Lowe & Kreig, 2009).
Dynamometer Dynamometers can be used to measure force, torque, or power.	Open Circuit Calorimeter Open Circuit Calorimeters can be used to measure energy expenditure.	Computer Software Computer software may be needed when gathering data electronically (Lowe & Kreig, 2009).

Exhibit 9-1 (Continued) Instrument Measurement of Physical Demands: Practice Description and Results	
Resources Needed (Continued)	
<i>Additional Resource(s) Needed</i>	
Access to Workspace Access to workspace is needed in order to gather data on site (Jacobs, 1997; Keyserling et al., 1991; Martinko, 1988; Matheson, 2010; OHCOW, n.d.; Perez, 2006; Rodgers, 1992).	Computer A computer may be needed when gathering data electronically (Lowe & Kreig, 2009).
Pros/Cons	
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Data typically have high reliability and validity and are relatively easy to aggregate (Jacobs, 1997; Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010; OHCOW, n.d.; Perez, 2006; Rodgers, 1992) ▶ Results in precise, accurate data on physical demands (Jacobs, 1997; Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010; OHCOW, n.d.; Perez, 2006; Rodgers, 1992) 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Useful for examining physical demands only; does not collect other types of data ▶ Can be time consuming and resource intensive (Lowe & Kreig, 2009) ▶ May result in a large quantity of data that can be difficult to manage (Lowe & Kreig, 2009) ▶ May be intrusive to incumbents (Lowe & Kreig, 2009) ▶ Often involves the use of complex measuring devices that require technical training (Lowe & Kreig, 2009; Matheson, 2010)
Expert Evaluation	
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<ul style="list-style-type: none"> ▶ Precise, accurate data on physical demands are collected (Jacobs, 1997; Keyserling et al., 1991; Lowe & Kreig, 2009; Matheson, 2010; OHCOW, n.d.; Perez, 2006; Rodgers, 1992). ▶ This procedure has a long history of support (e.g., Durnin & Passmore, 1967). ▶ This method is highly defensible when examining physical demands only.





Exhibit 9-1 (Continued)	
Instrument Measurement of Physical Demands: Practice Description and Results	
 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ In the hands of the trained, instrumentation is highly valuable in precisely measuring metabolic demands.</p>	<p>▶ When using the instruments correctly, data should be highly reliable.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ This procedure is perceived as a highly credible method of collecting physical demands data.</p>	<p>▶ Training may take a significant amount of time if more technical equipment is needed.</p> <p>▶ Individuals without undergraduate training may have difficulty mastering the technology.</p>
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input checked="" type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ While steps can be taken to increase confidentiality, this procedure is somewhat intrusive.</p>	<p>▶ Instrument measurement of physical demands may be time consuming and thus resource intensive.</p>

Exhibit 9-1 (Continued) Instrument Measurement of Physical Demands: Practice Description and Results	
 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<ul style="list-style-type: none"> ▶ Many jobs that are more sedentary or cognitive in nature do not require this level of data collection. ▶ This procedure may not be practical for such large scale, generalized use. 	<ul style="list-style-type: none"> ▶ This is undoubtedly the most precise procedure for measurement of physical demands.
<p>Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input checked="" type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<ul style="list-style-type: none"> ▶ This procedure collects data on the required physical demands during work activities, but it does not collect data on the nature of the activities themselves. 	<ul style="list-style-type: none"> ▶ This procedure helps to inform the needed physical abilities but needs to be combined with other procedures to gather data on different types of KSAs.

Chapter 10: Supplementary Job Analysis Procedures

This chapter provides an overview of supplemental job analysis procedures that were considered as part of this project. The procedures described in this chapter include those that did not have sufficient published empirical support and/or were not suited to SSA's OIS needs. Exhibit 10-1 presents the nine job analysis procedures that are included in this supplementary chapter.

Exhibit 10-1 Additional Job Analysis Procedures Included in Supplementary Chapter	
1. Automated Capture	6. Physiological Measures
2. Forecasting	7. Psychological Scaling
3. Generate Scenarios of Possible Future Events	8. Verbal Report
4. Motion Study	9. Work Diary/Work Log
5. Performance Measurement	

The job analysis procedures listed in the above exhibit are further described in Exhibit 10-2. For each procedure, we provide a summary of the practice (first bullet(s)) and then the reason for its inclusion in the supplemental chapter rather than a major summary chapter (last bullet).

Exhibit 10-2 Additional Job Analysis Procedures	
Procedure	Description of Procedure
1. Automated Capture	<ul style="list-style-type: none"> ▪ Automated capture is a job analysis procedure that can be used to collect data to inform many different types of job analyses, but the procedure is usually associated with Cognitive Task Analysis (Crandall, Klein, & Hoffman, 2006). When using automated capture, data are recorded electronically such as through the use of computer-based simulations. This means that data collection is easy and precise and there is little opportunity for error in the data collection. (Crandall et al., 2006). ▪ However, some potential downsides to this procedure are that it can be difficult to program the computer system and it does not allow for follow-up questions or deeper questioning about incumbents' responses (Crandall et al., 2006). Additionally automated capture has not been a widely used or researched topic (Crandall et al., 2006).

Exhibit 10-2 (Continued) Additional Job Analysis Procedures	
Procedure	Description of Procedure
2. Forecasting	<ul style="list-style-type: none"> ▪ Forecasting is used to predict changes in jobs that can be expected in the future (Singh, 2008). Knowledge of these expected changes in the structure or nature of the jobs can be used to specify the knowledge, skills, and abilities that employees will need to perform the job in the future. When using forecasting, data comes from various organizational materials. A great deal of historical data about the job is necessary to use advanced statistics or complete formulas and calculations, which are typically quite complex (Singh, 2008). ▪ Forecasting is not used to provide information about what is needed for the job currently, but rather what will be needed for the job at some point in the future. As such, it is not a procedure that would be effective in helping SSA to meet its job analysis methodology goals.
3. Generate Scenarios of Possible Future Events	<ul style="list-style-type: none"> ▪ Much like with forecasting, generating scenarios about possible future events can be used to predict changes that can be expected in the future nature of jobs (Singh, 2008). These scenarios contain situations that the organization using the scenarios could be expected to experience at some time in the future (Singh, 2008). The scenarios can then be compared to the current work situation to examine changes in employee characteristics that will be needed in the future. ▪ Generating scenarios about future job conditions will likely not be beneficial for SSA's purposes because it does not provide information about the actual needs for the job at the present time, but rather what may be necessary for the job in the future. Additionally, because the scenarios are about expected events in the future rather than actual situations, they will likely not contain the level of detail that SSA requires
4. Motion Study	<ul style="list-style-type: none"> ▪ Motion study analysis comes from the field of Industrial Engineering and is used for describing, examining, and improving methods of performing work (Gael, 1988). These studies typically include job observation, but there can be a variety of techniques used to gather information about the job (Gael, 1988). Motion studies typically gather information on the processes that are involved in work, the tools and equipment used, and the raw materials and outputs in the job. ▪ Motion studies place a great deal of emphasis on the efficiency with which individuals complete a job and increasing productivity rather than on the job's minimum requirements (Brannick & Levine, 2002; Brannick et al., 2007). SSA requires a job analysis method that is able to measure the minimum requirements for the job (Social Security Administration, 2009), and therefore motion studies are likely not appropriate for SSA's needs.

Exhibit 10-2 (Continued) Additional Job Analysis Procedures	
5. Performance Measurement	<ul style="list-style-type: none"> ▪ Performance measurement, which comes from the field of human factors, can be used to capture task descriptions, measure the mental workloads of incumbents as well as to collect data on task performance (Gael, 1988). There are a variety of techniques that can be used to measure performance. For example, performance on secondary tasks can be measured or an occlusion technique can be used that involves measuring performance when visual input is blocked. This technique would require the incumbent to wear a visor to partially block his or her vision while performing a task. A negative to this approach is that it could present a safety hazard because of the limited vision that is imposed on the incumbent performing the task (Gael, 1988). ▪ Performance measurement will likely not be beneficial for SSA's purposes because its focus is on the performance of tasks rather than the actual tasks that are required on the job.
6. Physiological Measures	<ul style="list-style-type: none"> ▪ As part of Mental Workload Assessment, physiological measures can be used to help determine the mental load of the worker (Gael, 1988). Physiological indices, such as heart rate, blood pressure, breathing, eye movement, and pupil dilation, have been used as metrics of mental load. Physiological measures gather very precise data through the use of various monitoring devices, such as catheters, electrodes, or blood pressure cuffs (Gael, 1988). ▪ Using physiological measures may be beneficial when considers peaks in workloads or emergency situations, but will likely not be beneficial for SSA's purposes given that the indices measured vary from person to person and can be affected by variations in an individual's mental, physical, or emotional state. Additionally, the equipment can be uncomfortable and intrusive to use as well as expensive or difficult to obtain (Gael, 1988).
7. Psychological Scaling	<ul style="list-style-type: none"> ▪ Psychological scaling is a job analysis procedure that can be used as a part of Cognitive Task Analysis (Brannick & Levine, 2002; Brannick et al., 2007). With this procedure, job experts are asked to sort, rank, or rate the similarity of various objects. Then, a scaling or clustering program is used to provide quantitative results based on the expert responses. ▪ Psychological scaling can vary greatly depending on the situation or judgments made when completing the job analysis (Brannick & Levine, 2002; Brannick et al., 2007). Because of this variation, it is likely not a good fit for SSA's job analysis methodology purposes.

Exhibit 10-2 (Continued) Additional Job Analysis Procedures	
8. Verbal Report	<ul style="list-style-type: none"> ▪ Verbal report, which can be a part of Cognitive Task Analysis, involves having an incumbent think out loud and verbalize what they are thinking or doing while completing a job task (Brannick & Levine, 2002; Brannick et al., 2007). Verbal report can be used to collect information regarding tasks and duties performed on the job, knowledge and skills required, and information about the cognitive processes used to complete tasks. With this method, the emphasis is really on the cognitive processes of workers on the job (Brannick & Levine, 2002; Brannick et al., 2007). ▪ While verbal report can assist in collecting very detailed information and help to understand how experts perform the job, there are also some drawbacks to this procedure. Verbal report can be very expensive and time consuming to complete. Additionally, there are many opportunities for job analysts or incumbents to make personal judgment calls and the procedure is not standardized, which can lead to large variations in the administration of the verbal report job analysis procedure (Brannick & Levine, 2002; Brannick et al., 2007).
9. Work Diary/ Work Log	<ul style="list-style-type: none"> ▪ Another job analysis procedure is the use of work diaries or work logs. The work diary or log requires the job incumbent to track activities that occur during specific time frames within the work day to collect data about the job (Gael, 1988). Work diaries or logs are especially useful when there is not a great deal of information already documented about work activities. Work diaries or work logs are generally most useful for collecting information regarding required job tasks but can also be used to collect a variety of other information, such as tools and equipment used on the job, personality characteristics, or environment conditions/work context (Gael, 1988). ▪ SSA needs a job analysis methodology that does not rely on incumbent ratings of job tasks (Social Security Administration, 2009), and due to the fact that when using work diaries or work logs data must be provided only by job incumbents, this procedure is not well suited to the needs of SSA.

SECTION 3: Established Models Results Chapters

Section 3 provides descriptions of each of the most relevant established job analysis models and is comprised of the following nine chapters:

Chapter 11: Arbeitswissenschaftliches Erhebungsverfahren zur Tätigkeitsanalyse (AET)

Chapter 12: Common-Metric Questionnaire (CMQ)

Chapter 13: Cognitive Task Analysis

Chapter 14: Fleishman Ability Requirement Scales

Chapter 15: Functional Job Analysis (FJA)

Chapter 16: Job Element Model

Chapter 17: Occupational Information Network (O*NET)

Chapter 18: Position Analysis Questionnaire (PAQ)

Chapter 19: Task Inventory

Chapter 20: Threshold Traits Analysis (TTA)

Chapter 21: Supplementary Job Analysis Models

The first 10 chapters in Section 3 provide detailed information about each of the ten most relevant established job analysis models. Within each chapter, a general description of the job analysis model is provided along with the disciplines that use the practice (e.g., I/O Psychology), quality and data considerations (e.g., reliability/standardization), source(s) of data (e.g., incumbents), data collection procedures (e.g., job observation), type of data collected (e.g., KSAs), resources needed (e.g., time and money to develop), legal defensibility, and pros/cons. Chapter 21 provides brief summaries of job analysis models that do not have sufficient published empirical support and/or are not suited to SSA's OIS needs. While the models presented in the supplementary chapter

Chapter 11: Arbeitswissenschaftliches Erhebungsverfahren zur Tätigkeitsanalyse (AET)

This chapter provides a summary of the Arbeitswissenschaftliches Erhebungsverfahren zur Tätigkeitsanalyse (AET) job analysis method. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. A typical AET job analysis involves both a job observation of the incumbent and an interview of the incumbent and direct supervisor.



Exhibit 11-1 AET: Practice Description and Results

Arbeitswissenschaftliches Erhebungsverfahren zur Tätigkeitsanalyse (AET) is an ergonomic job analysis procedure that analyzes the physical and cognitive stresses endured by a worker when performing tasks on the job. Its focus is on the extent to which job demands provoke stress on the incumbent (Sanchez & Levine, 2001). With this focus on incumbent stress, the purpose of AET is typically to reduce the stress and strain that incumbents experience while trying to increase their performance (Brannick, Levine, & Morgeson, 2007). AET was originally developed by the German government to investigate discrimination against women at work with respect to pay and the goal was to develop a job analysis procedure that allowed a detailed investigation of workload and strain within a given work system (Landau, 2006).

Job Analysis Practice Highlights

- ▶ Focuses on the physical and psychological stresses of work tasks.
- ▶ Collects data via Job Observation and Interview.
- ▶ Collects Physical Demands, Cognitive Demands, Task Descriptions; Environmental Conditions/Work Context; Tools, Equipment, & Work Aides; Importance/Frequency Ratings; and Other data.
- ▶ Used primarily in Ergonomics.

To evaluate stress and strain, AET involves conducting an observation interview, which consists of observing the job and work environment first and interviewing the incumbents and direct supervisor second (Landau, 2006). This observation interview should be conducted by a trained job analyst. In AET, the observation should be the main means by which information is collected about the job, with the interview used to clarify information that could not be determined during the observation (Rohmert & Landau, 1983). AET collects data via a 216-item job analysis questionnaire covering three major elements: 1) the person-at-work system (i.e., work objects, equipment, and work environment); 2) tasks; and 3) demands (i.e., perception, decision, action) (Landau, 2006; Landau, Brauchler, & Rohmert, 2003). Each AET item is rated on a specific code (i.e., scale), such as significance, duration, frequency, alternative, or exclusive. This questionnaire is completed by the analyst following the observation interview (Rohmert & Landau, 1983). A typical observation interview takes 1 to 3 hours to complete (Landau, 2006). With AET, there is a strong emphasis on the equipment used in the workplace as well as the environment in which work occurs (Brannick et al., 2007). When using AET for job analysis, the observation interview and subsequent questionnaire completion should focus only on the job and workplace, without considerations for the worker performing the job (Rohmert & Landau, 1983).

Discipline(s)					
 Physical and Occupational Therapy <input type="radio"/> Yes <input checked="" type="radio"/> No	Occupational Health <input type="radio"/> Yes <input checked="" type="radio"/> No	Industrial/Organizational Psychology <input type="radio"/> Yes <input checked="" type="radio"/> No	Vocational Rehabilitation <input type="radio"/> Yes <input checked="" type="radio"/> No	Human Resources <input type="radio"/> Yes <input checked="" type="radio"/> No	 Ergonomics <input checked="" type="radio"/> Yes <input type="radio"/> No

**Exhibit 11-1 (Continued)
AET: Practice Description and Results**

Quality & Data Considerations		
<p style="text-align: center;">Level of Detail in Data Collected</p> <ul style="list-style-type: none"> <input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise <p>The job analyst collects information on job tasks by completing a detailed job observation and/or by interviewing the incumbent and his/her supervisor and rating items that can apply to multiple jobs. Ratings are not made for job-specific tasks and precise measurements are not required. (Landau, 2006; Rohmert, 1985).</p>	<p style="text-align: center;">Level of Job Performance Measured</p> <ul style="list-style-type: none"> <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal <p>AET captures typical performance on the job. While observing the job, the analyst is not required to see the best performer but rather notes how the job is normally performed by a typical incumbent (Rohmert, 1988).</p>	<p style="text-align: center;">Security of Data</p> <ul style="list-style-type: none"> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High <p>Although hard copy notes are taken during the interview and/or job observation, the data are entered into a computer program or into a standardized form for the coding of items. Data stored and transmitted electronically can be kept very secure, but data stored in hard copy format will have a lower level of security (Landau, 2006; Landau et al., 2003).</p>
<p style="text-align: center;">Validity of Data</p> <ul style="list-style-type: none"> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High <p>Although the job analyst is aware of the content of the AET questionnaire that must be completed after data collection is completed, there is room for job analyst judgment during the interview and/or job observation process. Therefore the validity of the data will depend on analyst judgments and perceptions (Landau, 2006).</p>	<p style="text-align: center;">Reliability of Data/ Standardization of Procedures</p> <ul style="list-style-type: none"> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> Complete <p>Most incumbents being analyzed through AET will have a very similar experience since the job analysts are aware of the items on the AET questionnaire, however, the data collection procedures (e.g., interview questions) may be slightly different because there is no specified interview or data observation protocol (Landau, 2006).</p>	<p style="text-align: center;">Ease of Data Aggregation</p> <ul style="list-style-type: none"> <input type="radio"/> Difficult <input checked="" type="radio"/> Moderate <input type="radio"/> Easy <p>Ratings on the AET questionnaire can be combined numerically because all items are rated on Likert-type scales with regard to the frequency and importance of items, therefore a pre-determined formula can be applied in regards to what ratings mean (Rohmert, 1988; Landau, 2006).</p>
Data Source(s)		
<p>Incumbents</p> <p>Incumbents are the object of the interview and job observation (Rohmert, 1988; Landau, 2006; Landau et al., 2003).</p>	<p>Direct Supervisors</p> <p>Direct supervisors may also be interviewed along with incumbent (Rohmert, 1988; Landau, 2006; Landau et al., 2003).</p>	

Exhibit 11-1 (Continued) AET: Practice Description and Results					
Target Data Collection Procedure(s)					
Review of Written Mats. <input type="radio"/> Yes <input checked="" type="radio"/> No	Job Observation <input checked="" type="radio"/> Yes <input type="radio"/> No	Survey <input type="radio"/> Yes <input checked="" type="radio"/> No	Interview <input checked="" type="radio"/> Yes <input type="radio"/> No	Focus Groups <input type="radio"/> Yes <input checked="" type="radio"/> No	Assessment of Physical Demands <input checked="" type="radio"/> Yes <input type="radio"/> No
Type of Data Collected					
Physical Demands The AET questionnaire contains items about the physical demands of the job, such as items about body posture, the frequency of movements, muscular work, vision, hearing, and smelling. Tasks are rated according to the associated physical strain and stress that are induced from performance (Rohmert, 1988; Landau, 2006; Landau et al., 2003).		Cognitive Demands The AET questionnaire contains items about cognitive demands, including time pressure, information processing, and decision making. Tasks are rated according to the associated psychological strain that is inducted from performance (Landau, 2006; Landau et al., 2003).		Task Descriptions The AET questionnaire captures the tasks or activities that have to be carried out on the job, such as tasks including material objects, person-related tasks, and the number of tasks in the job (Rohmert, 1988; Landau, 2006; Landau et al., 2003).	
Environmental Conditions/Work Context The AET questionnaire includes items regarding the physical work environment, hazards and risks, the social environment, and with whom the incumbent must communicate (Rohmert, 1988; Landau, 2006; Landau et al., 2003).		Tools, Equipment, & Work Aides The AET questionnaire includes items about working equipment, such as tools, software, means of transport, and controls (Rohmert, 1988; Landau, 2006; Landau et al., 2003).		Importance/Frequency Ratings The job analyst must respond to items by indicating the importance/significance of the tasks, the duration of tasks, and the frequency of the job characteristics. Additionally, phases of stress in the work are quantified according to duration, height, sequence, and temporal distribution within the work shift (Rohmert, 1988; Landau, 2006; Landau et al., 2003).	
Other Types of Data Collected The AET questionnaire includes items about how incumbents are paid and the position of the job in the organizational hierarchy (Landau, 2006).					

Exhibit 11-1 (Continued)
AET: Practice Description and Results

Resources Needed		
<p align="center">Length of Time to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (e.g., less than 1 month) <input type="radio"/> Medium (e.g., 1 to 6 months) <input type="radio"/> Long (e.g., 6 months or longer) <p>AET uses a pre-established questionnaire that can readily be used for any job without time required for development or modification.</p>	<p align="center">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>The AET questionnaire is an off-the-shelf questionnaire and therefore does not require development costs.</p>	
<p align="center">Length of Time to Administer</p> <ul style="list-style-type: none"> <input type="radio"/> Short (e.g., less than 2 hours) <input checked="" type="radio"/> Medium (e.g., 2 hours to 5 hours) <input type="radio"/> Long (e.g., 5 hours or longer) <p>The full AET procedure, including both a job observation and interview, usually takes about 3 hours (Landau, 2006; Landau et al., 2003).</p>	<p align="center">Monetary Cost to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>The AET procedure does not require the use of any expensive equipment or materials. The only equipment necessary for its administration is the AET checklist/questionnaire (FIOH, 2009).</p>	
<i>Data Documenting Resource(s)</i>		
<p align="center">Work/Job Analysis Instrument</p> <p>The 216-item AET job analysis questionnaire includes items on three major elements: 1) the person-at-work system (i.e., work objects, equipment, and work environment); 2) tasks; and 3) demands (i.e., perception, decision, action). The analyst completes the questionnaire on a standardized form or into a computer software program after the interview and/or job observation is complete (Landau, 2006; Landau et al., 2003).</p>	<p align="center">Hard Copy/Structured Note Pages</p> <p>Hard copy notes are taken while conducting the job observation and interview in order to complete the AET questionnaire at a later time (Landau, 2006; Landau et al., 2003).</p>	<p align="center">Computer Software</p> <p>Though not required, computer software is needed if the job analyst completes the AET questionnaire electronically (Landau, 2006).</p>
<i>Additional Resource(s) Needed</i>		
<p align="center">Access to Workspace</p> <p>In order to conduct a job observation, the job analyst must be given access to the workspace in which the job normally occurs (Landau, 2006; Landau et al., 2003).</p>	<p align="center">Computer</p> <p>Though not required, a computer is needed if the job analyst completes the AET questionnaire using the software (Landau, 2006).</p>	<p align="center">Meeting Space</p> <p>The job analyst may meet an incumbent and/or direct supervisor at the job site or a previously-designated meeting space to conduct the interview (Landau et al., 2003).</p>

Exhibit 11-1 (Continued)
AET: Practice Description and Results







 Pros/Cons 	
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Applicable to a wide range of jobs (Landau et al., 2003) ▶ Time-saving and economical (Landau et al., 2003) ▶ Evidence for inter-rater reliability (Landau et al., 2003) ▶ Requires few resources (FIOH, 2009) ▶ Items on the questionnaire have a sound basis (FIOH, 2009) ▶ There is a database of AET results for over 7,000 jobs that can be used as a reference (FIOH, 2009) 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Items may be difficult for individuals not trained in ergonomics to answer (Rohmert & Landau, 1983) ▶ No formal studies on the concurrent or predictive validity of AET (FIOH, 2009) ▶ AET focuses on a given content model, which may not include some elements important to disability determination ▶ AET uses a standardized instrument, which may not provide the details on a particular element that are important to disability determination
 Expert Evaluation 	
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <p>▶ The AET items and data collection process demonstrate face and content validity (FIOH, 2009).</p>	<ul style="list-style-type: none"> ▶ Has been successfully used in a variety of occupations (Landau et al., 2003). ▶ Although there is some support for this model, it collects a very specific set of data. ▶ This model is good at measuring physical and psychological demands in an efficient way. ▶ The AET builds validity through the use of multiple methods and support of a database.
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Further research needs to be conducted to demonstrate the validity of the AET.</p>	<p>▶ Further research needs to be conducted to demonstrate the reliability of the AET.</p>

Exhibit 11-1 (Continued)
AET: Practice Description and Results

Expert Evaluation (Continued)	
	
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>
<p>▶ The AET is primarily used by Ergonomists, and may not be very familiar to job analysis experts from other disciplines.</p> <p>▶ The AET is a standardized approach that may not be perceived as appropriate for SSA's needs.</p>	<p>▶ It may be difficult to train individuals without a background in ergonomics.</p>
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>
<p>▶ Steps to increase confidentiality can be implemented, such as requiring analysts to sign a confidentiality document for each organization.</p>	<p>▶ The AET is relatively low cost; however, the full approach can be relatively time consuming.</p>
<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>
<p>▶ The AET is applicable to a wide range of jobs.</p>	<p>▶ This standardized instrument may not have the details that are needed by SSA.</p>

**Exhibit 11-1 (Continued)
AET: Practice Description and Results**



Expert Evaluation (Continued)



Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ The AET measures certain work activities, but it does not capture specific tasks.
- ▶ This instrument would most likely need to be combined with other data collection procedures to collect the full range of data need by SSA.

- ▶ The AET captures certain KSAs, including certain physical and cognitive demands.
- ▶ This instrument would most likely need to be combined with other data collection procedures to collect the full range of data need by SSA.

Chapter 12: Common-Metric Questionnaire (CMQ)

This chapter provides a summary of the Common-Metric Questionnaire (CMQ) job analysis model. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. According to the CMQ technique, job analysis data are collected via a survey that is typically administered to job incumbents.

Exhibit 12-1

Common-Metric Questionnaire: Practice Description and Results

The Common-Metric Questionnaire (CMQ) was developed by Robert J. Harvey in the late 1980s based upon the data-people-things structure of the Functional Job Analysis (FJA) model. Through its development, the CMQ aimed to address several limitations of existing worker-oriented job analysis models by allowing incumbents to describe their own jobs, by increasing the verifiability and accuracy of ratings, and by producing ratings that allow managerial and non-managerial jobs to be rated on a common metric (Harvey, 1993; Harvey, 2004; Levy, 2009; OPRA Consulting Group, 2009).

The CMQ is typically administered to job incumbents, although it can also be administered to supervisors. It uses a "matrix" design to gather data, where rows represent generalized work activities and columns represent the applicable rating scales. Ratings are collected on a range of topics, including interpersonal activities, decision-making activities, mechanical and physical activities, and the work context. Frequency of activities is measured using a concrete rating scale that describes specific time intervals (e.g., "the activity is performed every few hours to daily") (Harvey, 1993; Harvey, 2004; OPRA Consulting Group, 2009; Personnel Systems & Technologies Corporation (PSTC), 2011). The remaining rating scales differ depending upon the activity being rated and address concerns such as criticality of the activity, the incumbent's role in the activity, and extent of consequences of the activity (PSTC, 2011).

Using the CMQ allows the analyst to quickly gather detailed information about the job using an "off-the-shelf" survey that applies to all jobs and all settings. Although more than 2,000 data points are collected for each job, most jobs can be rated in two hours or less (Harvey, 1993). In general, the CMQ is considered a strong job analysis practice that overcomes many of the problems of prior worker-oriented approaches (Levy, 2009).

Job Analysis Practice Highlights

- ▶ The CMQ is an off-the-shelf survey that applies to all occupations
- ▶ Collects data via a questionnaire
- ▶ Collects data on Worker Functions, which includes items regarding Cognitive Demands; Physical Demands; Environmental Conditions/Work Context; and Tools, Equipment, and Work Aids. Also collects data on Importance/Frequency of Activities.
- ▶ Used in Physical and Occupational Therapy, Industrial/Organizational Psychology and Human Resources.



Discipline(s)					
 Physical and Occupational Therapy <input checked="" type="radio"/> Yes <input type="radio"/> No	Occupational Health <input type="radio"/> Yes <input checked="" type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input type="radio"/> Yes <input checked="" type="radio"/> No	Human Resources <input checked="" type="radio"/> Yes <input type="radio"/> No	 Ergonomics <input type="radio"/> Yes <input checked="" type="radio"/> No

Exhibit 12-1 (Continued)
Common-Metric Questionnaire: Practice Description and Results

Quality & Data Considerations	
<p align="center">Level of Detail in Data Collected</p> <p> <input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise </p> <p>The CMQ uses rating scales with response options that provide a moderate level of detail. For example, time intervals such as “every few hours to daily” are used when rating frequency of activities (Harvey, 1993; Harvey, 2004; OPRA Consulting Group, 2009; PSTC, 2011).</p>	<p align="center">Level of Job Performance Measured</p> <p> <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal </p> <p>The CMQ method gathers information on how the job is typically performed (Harvey, 1993; Harvey, 2006; Levy, 2009; OPRA Consulting Group, 2009).</p>
<p align="center">Validity of Data</p> <p> <input type="radio"/> Low <input type="radio"/> Moderate <input checked="" type="radio"/> High </p> <p>Due to the use of specific, behaviorally-based items, a minimal amount of judgment is required when making CMQ ratings (Harvey, 1993; Harvey, 2006; Levy, 2009; OPRA Consulting Group, 2009).</p>	<p align="center">Reliability of Data/ Standardization of Procedures</p> <p> <input type="radio"/> Low <input type="radio"/> Moderate <input checked="" type="radio"/> Complete </p> <p>The CMQ is a standardized questionnaire that is presented in the same way in each administration (Harvey, 1993; Harvey, 2006; Levy, 2009; OPRA Consulting Group, 2009).</p>
<p align="center">Security of Data</p> <p> <input type="radio"/> Low <input type="radio"/> Moderate <input checked="" type="radio"/> High </p> <p>The CMQ is typically administered as a computer-based instrument, with responses entered directly by incumbents (Levy, 2009; OPRA Consulting Group, 2009; PSTC, 2011). Because data are captured electronically, security of data tends to be high.</p>	<p align="center">Ease of Data Aggregation</p> <p> <input type="radio"/> Difficult <input type="radio"/> Moderate <input checked="" type="radio"/> Easy </p> <p>The CMQ includes ratings on scales that must be cleaned and coded before being analyzed (Harvey, 1993), but since data are quantitative and collected electronically, data aggregation is relatively easy.</p>
Data Source(s)	
<p align="center">Incumbents</p> <p>Incumbents are the typical respondents on the CMQ (Harvey, 1993; Harvey, 2006; Levy, 2009; OPRA Consulting Group, 2009).</p>	<p align="center">Direct Supervisors</p> <p>It is also possible for direct supervisors to complete the CMQ (Harvey, 1993).</p>

Exhibit 12-1 (Continued) Common-Metric Questionnaire: Practice Description and Results					
Target Data Collection Procedure(s)					
Review of Written Mats. <input type="radio"/> Yes <input checked="" type="radio"/> No	Job Observation <input type="radio"/> Yes <input checked="" type="radio"/> No	Survey <input checked="" type="radio"/> Yes <input type="radio"/> No	Interview <input type="radio"/> Yes <input checked="" type="radio"/> No	Focus Groups <input type="radio"/> Yes <input checked="" type="radio"/> No	Assessment of Physical Demands <input checked="" type="radio"/> Yes <input type="radio"/> No
Type of Data Collected					
Worker Functions Worker functions form the foundation of the CMQ, which is composed of items assessing how workers interact with data, people, and things (Harvey, 1993; Harvey, 2004; OPRA Consulting Group, 2009; PSTC, 2011).	Cognitive Demands Ratings are collected on decision-making activities, such as information processing, decisions regarding the management of financial and human resources, and long-term planning (Harvey, 1993; Harvey, 2004; OPRA Consulting Group, 2009; PSTC, 2011).	Physical Demands Ratings are collected on physical activities, such as running, walking, lifting, and pushing (Harvey, 1993; Harvey, 2004; OPRA Consulting Group, 2009; PSTC, 2011).			
Environmental Conditions/Work Context Ratings are collected on the work context and environmental conditions, such as weather conditions, noise, time pressure, and control over work (Harvey, 1993; Harvey, 2004; Levy, 2009; OPRA Consulting Group, 2009; PSTC, 2011).	Tools, Equipment & Work Aids Ratings are collected on the machines and tools that must be used on the job (Harvey, 1993; Harvey, 2004; OPRA Consulting Group, 2009; PSTC, 2011).	Importance/Frequency of Activities Frequency of activities is measured using a concrete rating scale that describes specific time intervals (e.g., “the activity is performed every few hours to daily”) (Harvey, 1993; Harvey, 2004; OPRA Consulting Group, 2009; PSTC, 2011). The remaining rating scales differ depending upon the activity being rated. For example, decision making activities are also rated on the incumbent’s role in making and implementing the decisions and the highest level directly affected by the decisions, while physical activities are also rated on criticality and whether or not the job could be performed without being able to do the respective physical activity (PSTC, 2011).			

Exhibit 12-1 (Continued)
Common-Metric Questionnaire: Practice Description and Results

Resources Needed	
<p align="center">Length of Time to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (e.g., less than 1 month) <input type="radio"/> Medium (e.g., 1 to 6 months) <input type="radio"/> Long (e.g., 6 months or longer) <p>The CMQ is an off-the-shelf job analysis instrument; thus, development time is minimal.</p>	<p align="center">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>The CMQ is a well-defined and established method that requires minimal development cost.</p>
<p align="center">Length of Time to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (e.g., less than 2 hours) <input type="radio"/> Medium (e.g., 2 hours to 5 hours) <input type="radio"/> Long (e.g., 5 hours or longer) <p>Because the CMQ consists of a survey completed by a job expert (e.g., incumbent), the length of time for the job analyst is minimal. In terms of incumbent time, previous research indicates that positions are most often rated in one to two hours and the large majority of positions can be rated less than three hours (Harvey, 1993).</p>	<p align="center">Monetary Cost to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>There is no expensive equipment used and little additional resources beyond participant and analyst time are needed.</p>
<i>Data Documenting Resource(s)</i>	
<p align="center">Work/Job Analysis Instrument</p> <p>The questionnaire serves as the work/job analysis instrument for the CMQ, which is administered via computer. Work activities are rated on the frequency with which they are performed, as well as additional rating scales that vary depending on the activity being rated. Using a matrixed structure, the complete questionnaire gathers more than 2,000 data points (Harvey, 1993; Harvey, 2004; Levy, 2009; OPRA Consulting Group, 2009; PSTC, 2011).</p>	<p align="center">Computer Software</p> <p>Computer software is typically used to administer the CMQ (Levy, 2009; OPRA Consulting Group, 2009; PSTC, 2011).</p>
<i>Additional Resource(s) Needed</i>	
<p>Computer</p> <p>The CMQ is typically administered as a computer-based survey (Levy, 2009; OPRA Consulting Group, 2009; PSTC, 2011).</p>	

Exhibit 12-1 (Continued)
Common-Metric Questionnaire: Practice Description and Results



Pros/Cons



Positive Aspects of Practice

- ▶ Items are more behaviorally specific, and therefore more verifiable, than many other job analysis approaches (Harvey, 1993; Harvey, 2004; Levy, 2009; OPRA Consulting Group, 2009)
- ▶ Requires a lower reading level than other worker-oriented instruments and can therefore be completed by a wider variety of incumbents (Harvey, 1993; Harvey, 2004; Levy, 2009; OPRA Consulting Group, 2009)
- ▶ Relevant for both managerial and non-managerial occupations (Harvey, 1993; Harvey, 2004; Levy, 2009; OPRA Consulting Group, 2009)
- ▶ Despite the length of the survey, most occupations can be rated in less than three hours (Harvey, 1993; Levy, 2009)

Negative Aspects of Practice

- ▶ The full CMQ requires respondents to complete over 2,000 items per occupation (Harvey, 1993; Levy, 2009)
- ▶ Most of the literature regarding the CMQ is from unpublished sources, so careful evaluation of the method is warranted.
- ▶ Given that the CMQ focuses on a given content model, and the elements of that content model are examined with a standardized instrument, the following issues need to be considered:
 - The content model might not include some elements important to disability determination
 - The standardized instrument may not provide the details on a particular element that are important to disability determination



Expert Evaluation



Likelihood Practice will Be Legally Defensible

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely
- ▶ Focuses on behavioral, verifiable work activities (Harvey, 1993; Harvey, 2004; Levy, 2009; OPRA Consulting Group, 2009)

- ▶ The CMQ collects a specific set of data and is not likely to cover all of the elements needed for disability determination
- ▶ There is not a lot of research on the CMQ to demonstrate that it is legally defensible.
- ▶ Careful evaluation of the CMQ is warranted due to the fact that most of the literature on the CMQ is from unpublished sources.

Exhibit 12-1 (Continued)
Common-Metric Questionnaire: Practice Description and Results



Expert Evaluation (Continued)	
	
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p> <p> ▶ The focus of the CMQ is on behaviorally verifiable data; however, it has not been widely researched. ▶ Respondent fatigue can hurt the accuracy of ratings, and the 2000 items in this full scale could lead to fatigue. </p>	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p> <p> ▶ Further research should be completed on the CMQ to investigate its reliability. </p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p> <p> ▶ This approach is not particularly well-established. </p>	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p> <p> ▶ This is an off-the-shelf approach that is completed by incumbents. Analysts play a minimal role in administering the CMQ; thus, it would be very easy to train. </p>
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p> <p> ▶ Because the CMQ only involves the administration of a survey, this practice is minimally intrusive for organizations and confidentiality is highly likely. </p>	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p> <p> ▶ Minimal resources would be required to develop and implement this approach; however, it may need to be combined with other procedures to collect all necessary data. ▶ Some SMEs may have difficulty completing the number of items required in the CMQ. </p>

Exhibit 12-1 (Continued)
Common-Metric Questionnaire: Practice Description and Results



Expert Evaluation (Continued)



<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ This is an off-the-shelf approach that can be used for any occupation.</p>	<p>▶ Because the questionnaire is off-the-shelf, it applies to all jobs and is likely not granular enough to collect very specific data.</p>
<p>Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Although the CMQ collects some data on work activities, specific task data are not collected.</p>	<p>▶ Data on KSAs are not gathered directly, and it is unclear how the CMQ could be used to define minimum KSA levels.</p>

Chapter 13: Cognitive Task Analysis

This chapter provides a summary of the Cognitive Task Analysis (CTA) job analysis model. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. The CTA approach to job analyses takes advantage of multiple data collection procedures, which typically include reviewing written materials, interviews, self-reports (i.e., surveys and questionnaires), on-site observation, and automated collection of behavioral data.

Exhibit 13-1 Cognitive Task Analysis (CTA): Practice Description and Results

Cognitive Task Analysis (CTA) is an existing job analysis model that takes a cognitive psychology approach to work analysis. Job analysts are finding CTA more useful as work analysis has begun to shift towards accentuating the mental demands rather than the physical demands (Campbell & Kuncel, 2001; Clark, Feldon, Van Merriënboer, Yates, & Early, 2006; Crandall, Klein, & Hoffman, 2006). The CTA model is most applicable when the goal is to identify specific critical training needs, however, two other principle applications of CTA include 1) aiding the design of human/system interaction and 2) analyzing the bases of effective teamwork (Campbell & Kuncel, 2001). While this model relies on the same type of analysis techniques (e.g., interviewing, observation, and surveying) that are commonly used in other models, CTA differs from traditional job analysis models by focusing on the psychological processes underlying specific job behaviors. For example, instead of attempting to describe the traditional knowledges, skills, and abilities (KSAs) that relate to individual differences in performance in that role, CTA attempts to explain how individuals are able to perform work tasks at a specific performance level (Campbell & Kuncel, 2001; Wei & Salvendy, 2000).

The first step in the CTA process follows that of other model procedures. That is, trained job analysts begin by reviewing written materials (e.g., job descriptions, training manuals, performance evaluations, and job aides) in order to collect a traditional description of the work content. Unlike other models, the procedure for CTA then attempts to collect data related to the factors that distinguish the performance of an expert and novice, including the individual's goals, mental models, cognitive resources, and cognitive strategies (Campbell & Kuncel, 2001; Crandall et al., 2006). The collection of this type of data helps the analyst identify specific psychological processes that result in different levels of effective performance. Analysts typically rely on other data collection procedures, such as surveys, job observation, verbal reports (e.g., work logs/ daily journals), automated collection of behavioral data, and/or psychological scaling, to collect this information. Although CTA methods share common elements, they vary with respect to how they elicit knowledge, represent expert knowledge, and use the task in question to bring about expert performance (Crandall et al., 2006).

Job Analysis Practice Highlights

- ▶ Very flexible and easy to adapt to specific jobs with over 100 methods currently in use
- ▶ Data collected is valuable for creating training courses, with numerous studies accredit the method with improving job performance
- ▶ Collects data via Review of Written Materials, Job Observation, Survey, and Interviews
- ▶ Collects Task Descriptions; Cognitive Demands; and Knowledge, Skills, & Abilities
- ▶ Used in Industrial/Organizational Psychology, Human Resources, Vocational Rehabilitation, and Physical and Occupational Therapy

Exhibit 13-1 (Continued)
Cognitive Task Analysis (CTA): Practice Description and Results

The CTA model builds on the more traditional job analysis techniques, but seeks to provide additional information, specifically addressing the differences between higher level and novice performance (Clark et al., 2006; Crandall et al., 2006; Wei & Salvendy, 2000). In essence, CTA takes a research-based approach to perform job analyses intended to collect information on the mental processes (e.g., expectancies, decision making, problem detection, goal generation) that underlie task performance and the cognitive skills necessary to adequately respond to complex situations. Unfortunately, the CTA model is not feasible for all job analyses because it can quickly become time consuming and expensive. Furthermore, while identifying the resources and methods that distinguish a novice from expert performer can provide useful information regarding training needs, it is critical that the analyst acknowledges that CTA has degrees of freedom problems and avoids being misled by the idiosyncratic expert (Campbell & Kuncel, 2001).









 Discipline(s) 					
Physical and Occupational Therapy <input checked="" type="radio"/> Yes <input type="radio"/> No	Occupational Health <input type="radio"/> Yes <input checked="" type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input checked="" type="radio"/> Yes <input type="radio"/> No	Human Resources <input checked="" type="radio"/> Yes <input type="radio"/> No	Ergonomics <input type="radio"/> Yes <input checked="" type="radio"/> No
 Quality & Data Considerations 					
<p style="text-align: center;">Level of Detail in Data Collected</p> <p><input type="radio"/> General <input type="radio"/> Moderate <input checked="" type="radio"/> Precise</p> <p>CTA methods involve gathering detailed and precise information on how the job is performed. The data collected are specifically related to the mental processes (e.g., expectancies, decision making, problem detection, and goal generation) that underlie task performance (Campbell & Kuncel, 2001; Crandall et al., 2006).</p>		<p style="text-align: center;">Level of Job Performance Measured</p> <p><input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal</p> <p>Since CTA attempts to identify the cognitive processes and skills associated with performance in complex situations, the methods usually involve collecting data from incumbents performing at an average to maximal level (Brannick & Levine, 2002; Brannick, Levine, & Morgeson, 2007; Campbell & Kuncel, 2001; Crandall et al., 2006).</p>		<p style="text-align: center;">Security of Data</p> <p><input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High</p> <p>Because hard copy notes are typically taken while collecting all data (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Wei & Salvendy, 2000), security of data tends to be lower than electronic data collection and transmittal. When precautions for protecting and transmitting data are followed correctly, security of data is at least moderate under non-extenuating conditions.</p>	

Exhibit 13-1 (Continued)
Cognitive Task Analysis (CTA): Practice Description and Results

Quality & Data Considerations (Continued)

				
Validity of Data <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High The validity of the data depends on the specific data collection procedures used. For example, procedures such as a review of written materials, interview, and surveys generally reveal a moderate validity. However, a procedure such as job observation could result in data with low validity since it allows for opportunities for judgment and observer bias (Crandall et al., 2006).	Reliability of Data/ Standardization of Procedures <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> Complete The methods associated with CTA result in data reliability levels ranging from low to moderate. With over 100 methods currently in use, there is no standardization for CTA procedures. However, certain data collection procedures, such as structured interviews with incumbents and surveys, allow for some standardization (Clark et al., 2006).	Ease of Data Aggregation <input checked="" type="radio"/> Difficult <input type="radio"/> Moderate <input type="radio"/> Easy The ability to aggregate data collected through a variety of data collection procedures is generally difficult, but very much depends on the specific self-report measure being used (e.g., survey, diary) and the format of the data itself (i.e., raw and qualitative data recorded on a notepad vs. clean and structured data entered into a coding system) (Crandall et al., 2006).		

Data Source(s)

			
Incumbents Incumbents are typically asked to complete a survey, such as the Purdue CTA Questionnaire or be the object of an interview and/or job observation (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Wei & Salvendy, 2000).	Organizational Materials Position descriptions, organizational/departmental manuals, technical reports, or training materials may be reviewed before meeting with the incumbent and can be used to supplement the data collected from the incumbent (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Wei & Salvendy, 2000).		

Target Data Collection Procedure(s)



							
Review of Written Mats. <input checked="" type="radio"/> Yes <input type="radio"/> No	Job Observation <input checked="" type="radio"/> Yes <input type="radio"/> No	Survey <input checked="" type="radio"/> Yes <input type="radio"/> No	Interview <input checked="" type="radio"/> Yes <input type="radio"/> No	Focus Groups <input type="radio"/> Yes <input checked="" type="radio"/> No	Assessment of Physical Demands <input type="radio"/> Yes <input checked="" type="radio"/> No		

Exhibit 13-1 (Continued)
Cognitive Task Analysis (CTA): Practice Description and Results

Target Data Collection Procedure(s) (Continued)		
<p>Verbal Reports (e.g., Work Logs/Journals)</p> <p>Verbal reports (e.g., work logs/journals) require the job performers to maintain records of their thought processes while performing tasks and making decisions about their job. Although the quality of the data largely depends on the incumbents' motivation and willingness to complete entries consistently, as well as their ability to accurately record this information, verbal reporting provides opportunities to capture important data by offering greater flexibility of format and content (Brannick & Levine, 2002; Brannick et al., 2007).</p>	<p>Automated Capture Systems</p> <p>Automated capture systems use computer software to automatically record usability data by mimicking the user and recording activities for subsequent analysis. These systems are primarily applied to with the specific purpose of capturing unconscious knowledge of the performer (Brannick & Levine, 2002; Brannick et al., 2007).</p>	<p>Psychological Scaling</p> <p>Psychological scaling is an analytical procedure that typically involves obtaining judgments about concepts, converting data into pair-wise comparisons, and then deriving a concept structure through multivariate statistical procedures (Brannick & Levine, 2002; Brannick et al., 2007).</p>
Type of Data Collected		
<p>Cognitive Demands</p> <p>CTA methods and tools seek to identify and describe the mental processes that underlie task performance and the cognitive skills necessary to adequately respond to complex situations. For example, the Purdue CTA Questionnaire measures eight cognitive job dimensions, such as audio attention, cognitive information processing, analyzing information, and mental planning and scheduling (Crandall et al., 2006; Wei & Salvendy, 2000).</p>	<p>Knowledges, Skills, & Abilities</p> <p>In order to identify the cognitive processes required to perform the job, it is necessary to gather information on the employee's knowledge and skills. This includes declarative knowledge, procedural knowledge, generative knowledge, self knowledge, automated skills, representational skills, and decisions-making skills (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006).</p>	<p>Task Descriptions</p> <p>CTA includes gathering a detailed list of the tasks and duties associated with performing the job (Crandall et al., 2006).</p>

Exhibit 13-1 (Continued)
Cognitive Task Analysis (CTA): Practice Description and Results

Resources Needed		
<p align="center">Length of Time to Develop</p> <ul style="list-style-type: none"> <input type="radio"/> Short (e.g., less than 1 month) <input type="radio"/> Medium (e.g., 1 to 6 months) <input checked="" type="radio"/> Long (e.g., 6 months or longer) <p>With over 100 methods currently in use, it may take significant time to identify the appropriate set of data collection procedures to use and to train job analysts in successfully collecting reliable and valid data for each procedure (Clark et al., 2006).</p>	<p align="center">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input type="radio"/> Inexpensive <input checked="" type="radio"/> Moderate <input type="radio"/> Expensive <p>With over 100 methods currently in use, it may take significant time and resources to train job analysts in successfully collecting reliable and valid data for each procedure (Clark et al., 2006). Additionally, cost may be incurred if an automated capture system is being used (Brannick & Levine, 2002; Brannick et al., 2007).</p>	
<p align="center">Length of Time to Administer</p> <ul style="list-style-type: none"> <input type="radio"/> Short (e.g., less than 2 hours) <input type="radio"/> Medium (e.g., 2 hours to 5 hours) <input checked="" type="radio"/> Long (e.g., 5 hours or longer) <p>The amount of time needed to administer varies depending on the specific data collection procedures used, however, the CTA process is generally time-consuming and thus expensive in terms of labor hours. Using a survey method (e.g., Purdue Cognitive Task Analysis Questionnaire) takes less time and cost to administer than other data collection procedures (Campbell & Kuncel, 2001; Wei & Salvendy, 2000).</p>	<p align="center">Monetary Cost to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>Although CTA is time-consuming and expensive in terms of labor hours, there is not a great monetary cost for the administration of CTA. Surveys may be the lowest cost approach (Brannick & Levine, 2002; Brannick et al., 2007; Campbell & Kuncel, 2001; Wei & Salvendy, 2000).</p>	
Data Documenting Resource(s)		
<p align="center">Hard Copy/Structured Notes</p> <p>Hard copy notes are taken while collecting all data (e.g., while reviewing materials, interviewing, or observing job) (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Wei & Salvendy, 2000).</p>	<p align="center">Work/Job Analysis Instrument</p> <p>The Purdue Cognitive Task Analysis Questionnaire is a 98-item job analysis instrument that is completed by incumbents. The questionnaire measures eight cognitive job dimensions, such as audio attention, cognitive information processing, analyzing information, and mental planning and scheduling (Wei & Salvendy, 2000).</p>	<p align="center">Computer Software</p> <p>The specific software needed to document the data collected depends on the automated capture method being used (Brannick & Levine, 2002; Brannick et al., 2007).</p>

Exhibit 13-1 (Continued)
Cognitive Task Analysis (CTA): Practice Description and Results



	
<i>Data Documenting Resource(s) (Continued)</i>	
<p style="text-align: center;">Voice Recorder</p> <p>Though not necessary, the analyst may find it helpful to record the incumbent’s responses to questions asked during the interview to serve as a resource to refer back to during the job analysis (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Wei & Salvendy, 2000).</p>	<p style="text-align: center;">Video Recorder</p> <p>Though not necessary, the analyst may find it helpful to video record the incumbent performing complex tasks when conducting job observations (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Wei & Salvendy, 2000).</p>
<i>Additional Resource(s) Needed</i>	
<p style="text-align: center;">Meeting Space</p> <p>The job analyst may meet an incumbent at the job site or a previously-designated meeting space to conduct an interview (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006).</p>	<p style="text-align: center;">Access to Workspace</p> <p>In order to conduct a job observation, the job analyst must be given access to the workspace in which the job normally occurs (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006).</p>
<p style="text-align: center;">Computer</p> <p>Though not required, a computer is needed if the job analyst is using an automated capture method (Brannick & Levine, 2002; Brannick et al., 2007).</p>	<p style="text-align: center;">Access to Organizational Materials</p> <p>Access to organizational materials, such as job descriptions and training materials, is needed in order to conduct a review of written materials (Carlisle, 1986; Gael, 1990).</p>
	
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Provides unique and detailed information about the mental processes and complex skills necessary for performing work (Campbell & Kuncel, 2001; Clark et al., 2006) ▶ Identifies the different knowledge structures and mental processes between novice and expert job performers (Brannick & Levine, 2002; Brannick et al., 2007; Clark et al., 2006; Crandall et al., 2006; Wei & Salvendy, 2000) ▶ Data collected are useful for many applications, especially training (Brannick & Levine, 2002; Brannick et al., 2007; Clark et al., 2006; Crandall et al., 2006; Wei & Salvendy, 2000) 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ The majority of methods used in CTA require considerable time and resources, increasing the total costs (Brannick & Levine, 2002; Brannick et al., 2007; Crandall et al., 2006; Wei & Salvendy, 2000) ▶ Results from studies exploring the validity and reliability of self-report methods associated with CTA indicate that people have considerable difficulty reporting on their own cognitive processes (Brannick & Levine, 2002; Brannick et al., 2007) ▶ The primary concern with observational methods are that the events observed may not be typical and that the observers have to be highly skilled in order to capture what is going on (Crandall et al., 2006)

Exhibit 13-1 (Continued)
Cognitive Task Analysis (CTA): Practice Description and Results



Pros/Cons (Continued)



- | | |
|--|---|
| <ul style="list-style-type: none"> ▶ Self-report methods, such as surveys and questionnaires, have an efficiency advantage since they do not require the presence of an interviewer or skilled data collector (Brannick & Levine, 2002; Brannick et al., 2007) ▶ Observations provide opportunities to identify and explore the actual work demands of the job; what sorts of strategies skilled workers have developed for coping; how work flows across the environment, the team, and the shift; and communication and coordination issues (Clark et al., 2006; Crandall et al., 2006) ▶ The automated capture system offers ease and precision of data collection. The potential naturalness of embedding data capture in the computer-guided flow of events has benefits and appeal (Brannick & Levine, 2002; Brannick et al., 2007) | <ul style="list-style-type: none"> ▶ When applying the automated capture system to CTA, it requires great effort to program the system, it is difficult to determine when to interrupt task performance, and the knowledge capture is insensitive to nuances, confusions, and questions that the participant might raise (Crandall et al., 2006) ▶ The automated capture is not well suited for follow-up interrogation or deeper probing to follow up participants' comments; it does not lend itself to the back-and-forth, interactive data gathering that is possible in interview and observational settings (Crandall et al., 2006) |
|--|---|



Expert Evaluation



Likelihood Practice will Be Legally Defensible

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

- ▶ CTA takes a research-based approach to perform job analyses intended to collect information on the mental processes (e.g., expectancies, decision making, problem detection, goal generation) that underlie task performance and the cognitive skills necessary to adequately respond to complex situations (Campbell & Kuncel, 2001).
- ▶ While CTA is well suited to collecting information regarding mental processes, it may not be suited for collecting the type of data that SSA needs.

Exhibit 13-1 (Continued)
Cognitive Task Analysis (CTA): Practice Description and Results



 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Validity of CTA depends on the specific data collection procedures that are used.</p>	<p>▶ Reliability of CTA depends on the specific data collection procedures that are used.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ While CTA is a well-known approach, it may not be perceived as appropriate for SSA.</p>	<p>▶ Although CTA is a somewhat complex approach, analysts could most likely be trained on this job analysis model.</p>
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input checked="" type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Steps to increase confidentiality can be implemented, such as requiring analysts to sign a confidentiality document for each organization.</p>	<p>▶ This is a labor intensive approach, which may not be worth the resources for SSA to expend given the type of data it collects.</p>

Exhibit 13-1 (Continued)
Cognitive Task Analysis (CTA): Practice Description and Results



Expert Evaluation (Continued)



Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

▶ This approach is most appropriate to jobs that contain a substantial cognitive component and may not be applicable to all jobs. Additionally, some SMEs have difficulty reporting on their cognitive processes.

Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

▶ CTA collects specific data on mental processes but does not collect all of the data that would be needed by SSA.

Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

▶ Since CTA is focused on mental processes, it's possible the full range of tasks and required work activities might not be covered.

Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)

- Very Unlikely
- Somewhat Unlikely
- Somewhat Likely
- Very Likely

▶ Since CTA is focused on mental processes, it's possible the full range of required KSAs might not be covered. In particular, CTA may not provide sufficient information on physical demands.

Chapter 14: Fleishman Ability Requirement Scales

This chapter provides a summary of the Fleishman Ability Requirement Scales (F-JAS) job analysis model. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. The primary data collection procedure in the F-JAS model involves the administration of a survey; however, other methods such as document review, interviews, or focus groups may be employed prior to the survey in order to develop a list of task statements.

Exhibit 14-1 Fleishman Ability Requirement Scales: Practice Description and Results

The Fleishman Ability Requirements Scales (F-JAS) job analysis model was developed in the 1980s by Fleishman and his colleagues. Since that time, one of its most notable applications has been as the basis for the abilities included in the O*NET framework (Sanchez & Levine, 2001).

The primary data collection procedure for the Ability Requirements Scales model involves the administration of a survey, which consists of 52 abilities in four categories: 1) cognitive, 2) psychomotor, 3) physical, and 4) sensory/perceptual (Gatewood, Feild, & Barrick, 2008). Each of the abilities is rated on a behaviorally-anchored rating scale, which requires job experts to rate the level of

each ability that is required for satisfactory performance. Scales can be administered at either the job level (i.e., experts make one set of ratings based on the overall job description) or the task level (i.e., experts make separate sets of ability ratings for each of the job tasks) (Fleishman & Mumford, 1988). When ratings are collected at the task level, job analysts are required to develop a task list through data collection procedures such as review of written materials, interviews, and/or focus groups, in addition to the primary data collection procedure using the survey.

The Ability Requirements Scales model includes stable taxonomies of ability that are generalizable to different jobs and useful in linking job tasks with the abilities necessary to perform them. Research supports the reliability of the scales as well as their ability to predict performance (Fleishman & Mumford, 1988). This model is considered easy to implement (Gatewood et al., 2008), as it can be completed in a short amount of time, at low cost, with a minimal amount of analyst training (Levine, Ash, Hall, & Sistrunk, 1983). Despite these advantages, this model also possesses a number of drawbacks. It is not suitable for all job analysis purposes (e.g., job description, job design), and job analysis experts have rated the model as low in both participant acceptability and outcome quality. Additionally, it requires a relatively large sample size (Levine et al., 1983).

Job Analysis Practice Highlights

- ▶ Serves as the basis for the ability data on O*NET
- ▶ Collects data primarily via survey
- ▶ Collects Knowledges, Skills, & Abilities; Physical Demands; Cognitive Demands; Task Descriptions; and Importance/Frequency Ratings.
- ▶ Used in Physical and Occupational Therapy, Industrial/Organizational Psychology, Vocational Rehabilitation, and Human Resources



Discipline(s)					
 Physical and Occupational Therapy <input checked="" type="radio"/> Yes <input type="radio"/> No	Occupational Health <input type="radio"/> Yes <input checked="" type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input checked="" type="radio"/> Yes <input type="radio"/> No	Human Resources <input checked="" type="radio"/> Yes <input type="radio"/> No	 Ergonomics <input type="radio"/> Yes <input checked="" type="radio"/> No

Exhibit 14-1 (Continued)
Fleishman Ability Requirement Scales: Practice Description and Results

Quality & Data Considerations		
<p align="center">Level of Detail in Data Collected</p> <p> <input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise </p> <p>Each of the abilities is rated on a behaviorally-anchored rating scale, which requires job experts to rate the level of each ability that is required for satisfactory performance. Scales can be administered at either the job level (i.e., experts make one set of ratings based on the overall job description) or the task level (i.e., experts make separate sets of ability ratings for each of the job tasks (Gatewood et al., 2008; Radziewicz, 1998). Thus, level of detail on the abilities data that are collected can range from moderate to precise.</p>	<p align="center">Level of Job Performance Measured</p> <p> <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal </p> <p>This method captures information on typical job performance (Fleishman & Mumford, 1988; Gatewood et al., 2008).</p>	<p align="center">Security of Data</p> <p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High </p> <p>According to the original approach, data are collected and submitted via hard copy surveys. Although hard copy surveys introduce the possibility of data entry-errors, data security should be at least moderate if analysts are properly trained and procedures are followed correctly.</p>
<p align="center">Validity of Data</p> <p> <input type="radio"/> Low <input type="radio"/> Moderate <input checked="" type="radio"/> High </p> <p>Because specific ability requirements data are collected from subject matter experts and minimal judgment from job analysts is required, validity of data is high (Fleishman & Mumford, 1988).</p>	<p align="center">Reliability of Data/ Standardization of Procedures</p> <p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> Complete </p> <p>The same abilities are rated in all job analyses; however, there is opportunity to customize the level of data needed (i.e., task-level or job-level) (Fleishman & Mumford, 1988).</p>	<p align="center">Ease of Data Aggregation</p> <p> <input type="radio"/> Difficult <input type="radio"/> Moderate <input checked="" type="radio"/> Easy </p> <p>Quantitative ratings are collected, which are easy to aggregate.</p>

Exhibit 14-1 (Continued)					
Fleishman Ability Requirement Scales: Practice Description and Results					
Data Source(s)					
<p style="text-align: center;">Incumbents</p> <p>Incumbents may participate in data collection during the development phase (e.g., interviews, focus groups) and are also typically participants in the survey (Fleishman & Mumford, 1988; Gatewood et al., 2008).</p>	<p style="text-align: center;">Direct Supervisors</p> <p>Direct supervisors may participate in data collection during the development phase (e.g., interviews, focus groups) and are often participants in the survey (Fleishman & Mumford, 1988; Gatewood et al., 2008).</p>				
<p style="text-align: center;">Organizational Materials</p> <p>Organizational materials serve as a data source when a document review is conducted as an initial data gathering technique (Fleishman & Mumford, 1988).</p>	<p style="text-align: center;">Other Subject Matter Experts</p> <p>In some cases, other subject matter experts may be involved in developing the task list or taking the survey (Fleishman & Mumford, 1988; Radziewicz, 1998).</p>				
Target Data Collection Procedure(s)					
<p>Review of Written Mats.</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p style="background-color: #D2691E; color: white;">Job Observation</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Survey</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Interview</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Focus Groups</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Assessment of Physical Demands</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>
Type of Data Collected					
<p style="text-align: center;">Knowledges, Skills, & Abilities</p> <p>Ability requirements are the primary focus of this model. For example, a few of the abilities include oral comprehension, written expression, information ordering, and time sharing (Fleishman & Mumford, 1988; Gatewood et al., 2008; Radziewicz, 1998).</p>	<p style="text-align: center;">Physical Demands</p> <p>Some of the abilities included in the Ability Requirements Scales are physical in nature (e.g., arm-hand steadiness, manual dexterity) (Fleishman & Mumford, 1988; Gatewood et al., 2008; Radziewicz, 1998).</p>	<p style="text-align: center;">Cognitive Demands</p> <p>Some of the abilities included in the Ability Requirements Scales are cognitive in nature (e.g., memorization, mathematical reasoning) (Fleishman & Mumford, 1988; Radziewicz, 1998).</p>			
<p style="text-align: center;">Task Descriptions</p> <p>Task statements are typically developed through document review, interviews, and/or focus groups, which describe what the worker does, for whom it is done, how it is done, and why it is done (Fleishman & Mumford, 1988; Gatewood et al., 2008).</p>	<p style="text-align: center;">Importance/Frequency of Activities</p> <p>Job experts rate the level of each ability required for satisfactory performance on a behaviorally anchored rating scale. In addition, when administering F-JAS at the task level, ratings such as task importance, frequency, and consequences of inadequate performance are collected (Fleishman & Mumford, 1988; Gatewood et al., 2008).</p>				

Exhibit 14-1 (Continued) Fleishman Ability Requirement Scales: Practice Description and Results		
Resources Needed		
<p style="text-align: center;">Length of Time to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (e.g., less than 1 month) <input type="radio"/> Medium (e.g., 1 to 6 months) <input type="radio"/> Long (e.g., 6 months or longer) <p>F-JAS is a well-defined and established method that requires minimal development time.</p>	<p style="text-align: center;">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>F-JAS is a well-defined and established method that requires minimal development cost.</p>	
<p style="text-align: center;">Length of Time to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (e.g., less than 2 hours) <input type="radio"/> Medium (e.g., 2 hours to 5 hours) <input type="radio"/> Long (e.g., 5 hours or longer) <p>If the Ability Requirement Scales are administered at the job-level, administration time is short; however, administration time will likely be longer if administered at the task-level.</p>	<p style="text-align: center;">Monetary Cost to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>There is no expensive equipment used and little additional resources beyond participant and analyst time are needed.</p>	
<i>Data Documenting Resource(s)</i>		
<p style="text-align: center;">Hard Copy/Structured Note Pages</p> <p>Hard copy/structured note pages may be used during the task list development phase (Gatewood et al., 2008).</p>	<p style="text-align: center;">Voice Recorder</p> <p>A voice recorder may be used during the task list development phase to capture data collected in interviews or focus groups (Gatewood et al., 2008).</p>	<p style="text-align: center;">Computer Software</p> <p>Computer software may be used to enter and analyze the job analysis data (Gatewood et al., 2008).</p>
<i>Additional Resource(s) Needed</i>		
<p style="text-align: center;">Meeting Space</p> <p>Meeting space may be needed during the task list development phase to conduct interviews or focus groups (Gatewood et al., 2008).</p>	<p style="text-align: center;">Computer</p> <p>A computer may be used to enter and analyze the job analysis data (Gatewood et al., 2008).</p>	<p style="text-align: center;">Access to Organizational Materials</p> <p>Access to organizational materials, such as job descriptions and training materials, is needed in order to conduct a review of written materials (Carlisle, 1986; Gael, 1990).</p>

Exhibit 14-1 (Continued)
Fleishman Ability Requirement Scales: Practice Description and Results





 Pros/Cons 	
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ F-JAS uses stable taxonomies of ability that are generalizable to different jobs and useful in linking job tasks with the abilities necessary to perform them (Fleishman & Mumford, 1988) ▶ Research supports the reliability of the Ability Requirements Scales as well as their ability to predict performance (Fleishman & Mumford, 1988) ▶ This model is considered easy to implement (Gatewood, Field, & Barrick, 2008) ▶ F-JAS can be completed in a short amount of time, at low cost, with a minimal amount of analyst training (Levine, Ash, Hall, & Sistrunk, 1983) ▶ The use of F-JAS in O*NET provides a distinct advantage, as these data could serve as a foundation for building a new OIS. 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ F-JAS is not suitable for all job analysis purposes (e.g., job description, job design) (Levine et al., 1983) ▶ Participants may not view F-JAS as an acceptable job analysis practice (Levine et al., 1983) ▶ The quality of the F-JAS outcome has been rated low by job analysis experts (Levine et al., 1983) ▶ F-JAS requires a relatively large sample size in comparison to other job analysis models (Levine et al., 1983) ▶ Given that the F-JAS focuses on a given content model, and the elements of that content model are examined with a standardized instrument, the following issues need to be considered: <ul style="list-style-type: none"> ○ The content model might not include some elements important to disability determination ○ The standardized instrument may not provide the details on a particular element that are important to disability determination
 Expert Evaluation 	
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> ○ Very Unlikely ○ Somewhat Unlikely ○ Somewhat Likely ● Very Likely <p>▶ Research supports the reliability of the Ability Requirements Scales (Fleishman & Mumford, 1988).</p>	<ul style="list-style-type: none"> ▶ Research supports the predictive validity of the Ability Requirements Scales (Fleishman & Mumford, 1988). ▶ This is a well-researched job analysis method that is respected in many fields. ▶ These scales may be highly defensible when examining abilities only. However, other aspects of the job, such as knowledges and skills must also be gathered through supplemental procedures.





Exhibit 14-1 (Continued) Fleishman Ability Requirement Scales: Practice Description and Results	
 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ There is research support for the validity of the F-JAS.</p>	<p>▶ Research indicates that this approach has high reliability.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ Job analysts typically view this as a credible procedure, although it collects a limited set of data.</p>	<p>▶ Although a variety of data collection procedures are involved in this approach, analysts could easily be trained on how to implement F-JAS.</p>
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ Steps to increase confidentiality can be implemented, such as requiring analysts to sign a confidentiality document for each organization.</p>	<p>▶ This approach requires few resources, as it involves minimal cost and time to administer.</p>

Exhibit 14-1 (Continued) Fleishman Ability Requirement Scales: Practice Description and Results	
 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ F-JAS can be applied to any type of occupation.</p>	<p>▶ A moderate level of detail is obtained through this approach, and it may not collect all of the data needed by SSA.</p>
<p>Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input checked="" type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Although task data may be collected, tasks are not a primary focus of this approach.</p>	<p>▶ Some scales are aimed at the upper levels of abilities and thus might not be effective at obtaining the level data for jobs commonly done by SSA claimants.</p> <p>▶ Data are collected on ability requirements only and not on knowledges or skills.</p>

Chapter 15: Functional Job Analysis (FJA)

This chapter provides a summary of the Functional Job Analysis (FJA) job analysis model. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. The full FJA method combines multiple data collection procedures, which typically include an interview and job observation at minimum, but also may consist of a review of written materials, a questionnaire, and focus groups.

Exhibit 15-1

Functional Job Analysis: Practice Description and Results

The Functional Job Analysis (FJA) model was initially developed in the 1930s by the Department of Labor (DOL) during the creation of the Dictionary of Occupational Titles. In creating this model, the aim was to gather two primary types of information: a description of the work that is performed and a description of the qualifications needed to be successful on the job. One of the fundamental distinctions of FJA is its focus on “what the worker does,” as opposed to “what gets done,” meaning that the model emphasizes the specific actions of the worker rather than merely describing the outcome of the work (Brannick & Levine, 2002; Brannick, Levine & Morgeson, 2007).

The *Revised Handbook for Analyzing Jobs (RHAJ)* is the primary source of instruction on the DOL’s FJA approach (U.S. Department of Labor, 1991). As described in the *RHAJ*, the full method combines multiple data gathering procedures, which typically include an interview and job observation at minimum, but also may consist of other procedures such as review of written materials and focus groups. Through each of these data gathering procedures, the job analyst collects data needed to complete the Job Analysis Report (JAR), a reporting tool used to structure the analysis and assist in recording the data (Droege, 1988; U.S. Department of Labor, 1991). Task statements are considered a central focus of FJA and include the work activity (i.e., an action verb and object of the action) and the outcome (i.e., the product or purpose). Tasks are ultimately listed in a logical sequence (e.g., in order of process, frequency, or importance). Despite the focus on task statements, FJA tasks are often described at a more general level than prescribed by other job analysis models, resulting in a relatively short list of task statements (Sanchez & Levine, 2001). For example, the DOT typically lists approximately three to 15 tasks per occupation (U.S. Department of Labor, 1991).

In addition to developing task statements, the job analyst collects ratings on a variety of additional variables. Under the DOL FJA model, these variables include worker functions (i.e., how the worker interacts with data, people, and things); physical demands; environmental conditions; personality characteristics (i.e., temperaments and interest areas); tools, equipment, and work aids; training and educational requirements; cognitive demands (i.e., reasoning, math, and language development); and other types of data, including the materials/subject matter of the work and the work field.

Job Analysis Practice Highlights

- ▶ FJA was the job analysis approach used to collect data for the Dictionary of Occupational Titles.
- ▶ Typically collects data via Job Observation and Interview.
- ▶ Collects Task Descriptions and Worker Functions, and other types of data which may include Physical Demands; Environmental Conditions; Personality Characteristics; Tools, Equipment, & Work Aids; Training & Educational Requirements; Cognitive Demands; Knowledges, Skills, and Abilities; and Importance/Frequency of Activities.
- ▶ Used in Physical and Occupational Therapy, Industrial/Organizational Psychology, Vocational Rehabilitation, Human Resources, and Ergonomics.

Exhibit 15-1 (Continued)
Functional Job Analysis: Practice Description and Results

A variation of the DOL approach to FJA is Fine’s FJA approach. The two variations are similar enough to be considered part of the same general model; however, several differences exist. Fine’s approach places a stronger emphasis on worker functions by gathering data on the orientation of each function (i.e., the percentage of a task occupied by data, people, and things) and involves rating the complexity and orientation of each function at the task level, rather than at the job level. While Fine’s approach is more comprehensive in terms of worker functions, it lacks several of the worker and organizational variables collected in the DOL approach, including temperaments and environmental conditions. Thus, Fine’s approach results in a stronger depth of worker function data, while the DOL approach results in a larger breadth of data (Brannick & Levine, 2002; Brannick et al., 2007).

FJA has been in wide use in both the public and private sectors for a number of decades (Fine, 1988). It is generally well accepted by participants and requires a relatively small sample size (Levine, Ash, Hall, & Sistrunk, 1983). Because the model was developed to analyze all jobs in the United States labor market, FJA was designed to be comprehensive, standardized, and efficient (Brannick & Levine, 2002; Brannick et al., 2007).





 Discipline(s) 					
Physical and Occupational Therapy <input checked="" type="radio"/> Yes <input type="radio"/> No	Occupational Health <input type="radio"/> Yes <input checked="" type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input checked="" type="radio"/> Yes <input type="radio"/> No	Human Resources <input checked="" type="radio"/> Yes <input type="radio"/> No	Ergonomics <input checked="" type="radio"/> Yes <input type="radio"/> No
 Quality & Data Considerations 					
<p style="text-align: center;">Level of Detail in Data Collected</p> <p><input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise</p> <p>The FJA approach includes a description of the major work tasks, as well as ratings of a variety of aspects of the job (Brannick & Levine, 2002; Brannick et al., 2007; Fine & Cronshaw, 1999; Jones, Steffy, & Bray, 1991; U.S. Department of Labor, 1991).</p>	<p style="text-align: center;">Level of Job Performance Measured</p> <p><input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal</p> <p>The FJA method gathers information on how the job is typically performed (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; Fine, 1988; U.S. Department of Labor, 1991).</p>			<p style="text-align: center;">Security of Data</p> <p><input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High</p> <p>Because the FJA method typically involves capturing data in hard copy, security of data tends to be moderate (Brannick & Levine, 2002; Brannick et al., 2007; Rogers, 1992). Although hard copy surveys introduce the possibility of data entry-errors, data should be reasonably secure if analysts are properly trained and procedures are followed correctly.</p>	

Exhibit 15-1 (Continued)
Functional Job Analysis: Practice Description and Results

Exhibit 15-1 (Continued)		
Quality & Data Considerations (Continued)		
<p align="center">Validity of Data</p> <p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High </p> <p>Although the data collection process involves some opportunity for judgment, use of detailed rating scales reduces this subjectivity (Brannick & Levine, 2002; Brannick et al., 2007; Fine & Cronshaw, 1999; U.S. Department of Labor, 1991).</p>	<p align="center">Reliability of Data/ Standardization of Procedures</p> <p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> Complete </p> <p>The same general procedures are used; however, features may be adapted by the job analyst to suit the specific situation (Brannick & Levine, 2002; Brannick et al., 2007; Fine & Cronshaw, 1999; Levine et al., 1983; U.S. Department of Labor, 1991).</p>	<p align="center">Ease of Data Aggregation</p> <p> <input type="radio"/> Difficult <input checked="" type="radio"/> Moderate <input type="radio"/> Easy </p> <p>Although the qualitative data that are initially collected are difficult to aggregate, they are ultimately quantified through the use of ratings, which increases the ease of aggregation (Department of Labor, 1991).</p>
Data Source(s)		
<p align="center">Incumbents</p> <p>Incumbents are the primary source of data for FJA procedures, including job observations and interviews (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; Fine & Cronshaw, 1999; Fine, 1988; Gatewood, Feild, & Barrick, 2008; Jones et al., 1991; Rogers, 1992; U.S. Department of Labor, 1991).</p>	<p align="center">Direct Supervisors</p> <p>In addition to or as an alternative to incumbents, direct supervisors may be interviewed about the job (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; Gatewood et al., 2008; Jones et al., 1991; Rogers, 1992; U.S. Department of Labor, 1991).</p>	<p align="center">Organizational Materials</p> <p>Organizational materials such as job descriptions, job specifications, minimum qualifications, training materials, process flowcharts, and organizational charts may be reviewed (Brannick & Levine, 2002; Brannick et al., 2007; Fine, 1988; U.S. Department of Labor, 1991).</p>
<p align="center">External Materials</p> <p>In addition to materials within the organization, the analyst may also review data on the job from external trade associations or professional societies, books or periodicals, and occupational resources from government agencies (Droege, 1988; U.S. Department of Labor, 1991).</p>	<p align="center">Human Resources Professionals</p> <p>Human Resources Professionals may be interviewed about the job (Rogers, 1992).</p>	<p align="center">Other Subject Matter Experts (SMEs)</p> <p>Other SMEs such as organizational medical staff, administrative personnel, or technical personnel may be interviewed about the job (Droege, 1988; Gatewood et al., 2008; Rogers, 1992).</p>

Exhibit 15-1 (Continued)
Functional Job Analysis: Practice Description and Results

Target Data Collection Procedure(s)					
Review of Written Mats.	Job Observation	Survey	Interview	Focus Groups	Assessment of Physical Demands
<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No
Type of Data Collected					
<p align="center">Task Descriptions</p> <p>The description of tasks is a central component in the FJA approach. Tasks should be described if they represent a distinct work activity and should ultimately be listed in a logical sequence (e.g., in order of process, frequency, or importance) (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; Fine & Cronshaw, 1999; Fine, 1988; Gatewood et al., 2008; Rogers, 1992; U.S. Department of Labor, 1991).</p>	<p align="center">Worker Functions</p> <p>Ratings are collected on the ways workers are required to function in relation to data (e.g., synthesizing, coordinating), people (e.g., mentoring, negotiating), and things (e.g., setting up, precision working) (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; Fine & Cronshaw, 1999; Fine, 1988; Gatewood et al., 2008; Jones et al., 1991; U.S. Department of Labor, 1991).</p>	<p align="center">Cognitive Demands</p> <p>The scale of General Educational Development (GED) involves making ratings on the level of required reasoning, mathematical, and language development (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; Fine, 1988; Jones et al., 1991; U.S. Department of Labor, 1991).</p>			
<p align="center">Physical Demands</p> <p>Ratings are collected on the strength of the work on a scale from sedentary to very heavy. Additional ratings are collected on the frequency of performing a variety of actions (e.g., climbing, balancing) as well as the required level of certain physical abilities (e.g., hearing, far acuity) (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; Rogers, 1992; U.S. Department of Labor, 1991).</p>	<p align="center">Environmental Conditions/Work Context</p> <p>Ratings are collected on the extent of exposure to certain conditions (e.g., weather, extreme heat, vibration), as well as noise intensity level (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; U.S. Department of Labor, 1991).</p>	<p align="center">Personality Characteristics</p> <p>Ratings are collected on recommended temperaments depending on the nature of the work (e.g., directing, repetitive, influencing, variety), as well as relevant interest areas (e.g., artistic, scientific, plants and animals, protective, mechanical) (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; U.S. Department of Labor, 1991).</p>			

Exhibit 15-1 (Continued)
Functional Job Analysis: Practice Description and Results

Type of Data Collected (Continued)		
<p align="center">Tools, Equipment, & Work Aids</p> <p>Ratings are collected on the machines, tools, equipment, and work aids that workers use in the job (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; U.S. Department of Labor, 1991).</p>	<p align="center">Training & Educational Requirements</p> <p>Specific Vocational Preparation (SVP) includes a rating of the length of training required on a scale ranging from "short demonstration only" to "over 10 years" (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; U.S. Department of Labor, 1991).</p>	<p align="center">Knowledges, Skills, & Abilities</p> <p>Ratings are collected on aptitudes required in the job. Additionally, FJA data collection procedures may ask incumbents to list the knowledges and skills/abilities necessary for the job (Fine & Cronshaw, 1999; Jones et al., 1991).</p>
<p align="center">Importance/Frequency of Activities</p> <p>The frequency of tasks should be assessed as well as the amount of time spent doing each task. Tasks may also be rated on importance or criticality (Fine, 1988; Rogers, 1992).</p>	<p align="center">Other Types of Data Collected</p> <p>Ratings are also collected on materials, products, subject matter, and services (MPSMS) and work fields (technology groupings and socioeconomic objectives). Data may also be collected on outputs of the job and performance standards (Brannick & Levine, 2002; Brannick et al., 2007; Fine & Cronshaw, 1999; Droege, 1988; Fine, 1988; Gatewood et al., 2008; U.S. Department of Labor, 1991).</p>	
Resources Needed		
<p align="center">Length of Time to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (e.g., less than 1 month) <input type="radio"/> Medium (e.g., 1 to 6 months) <input type="radio"/> Long (e.g., 6 months of longer) <p>FJA is a well-defined and established method that requires minimal development time.</p>	<p align="center">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>FJA is a well-defined and established method that requires minimal development cost.</p>	

Exhibit 15-1 (Continued)
Functional Job Analysis: Practice Description and Results

Resources Needed (Continued)

Length of Time to Administer

- Short (e.g., less than 2 hours)
- Medium (e.g., 2 hours to 5 hours)
- Long (e.g., 5 hours or longer)

Although the time to administer will vary depending on the data collection procedures used, the length of time is moderate when the recommended observation/interview approach is implemented. However, other procedures, such as focus groups, may take a longer amount of time.

Monetary Cost to Administer

- Inexpensive
- Moderate
- Expensive

There is no expensive equipment used and little additional resources beyond participant and analyst time are needed.

Data Documenting Resource(s)

Work/Job Analysis Instrument

The Job Analysis Report (JAR) form structures the analysis and assists in recording the data. The JAR should be tailored to the specific job analysis being performed, as it should contain space to record all necessary descriptions and ratings being collected. For example, it make contain blanks for all physical demand and environmental conditions ratings and larger spaces to record information such as task descriptions and tools/equipment (Brannick & Levine, 2002; Brannick et al., 2007; Droege, 1988; Rogers, 1992; U.S. Department of Labor, 1991).

Hard Copy/Structured Note Pages

Structured note pages are recommended for taking notes on job observations, interviews, and focus groups (Fine & Cronshaw, 1999; Gatewood et al., 2008; Jones et al., 1991).

Video Recorder

Job observations may be video recorded (Rogers, 1992).

Tape Measure

A tape measure may be used in a job observation to gather measurements of standing and seated postures (Rogers, 1992).

Scale

Scales may be used in a job observation to determine the amount of weight handled by incumbents (Rogers, 1992).





Exhibit 15-1 (Continued) Functional Job Analysis: Practice Description and Results		
 Resources Needed (Continued) 		
<i>Additional Resource(s) Needed</i>		
<p style="text-align: center;">Meeting Space</p> <p>When focus groups are used, a meeting space should be identified that is away from the workspace. The meeting space should include necessary items to aid in displaying information to the group, such as a flip chart and markers or a projector (Fine & Cronshaw, 1999; Gatewood et al., 2008).</p>	<p style="text-align: center;">Access to Workspace</p> <p>Access to the area where the work is performed is required for job observations (Rogers, 1992).</p>	<p style="text-align: center;">Access to Organizational Materials</p> <p>Access to organizational materials, such as job descriptions and training materials, is needed in order to conduct a review of written materials (Carlisle, 1986; Gael, 1990).</p>
 Pros/Cons 		
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Uses rating scales that improve the standardization and quantification of the data (Gatewood et al., 2008) ▶ Research supports the reliability of ratings (Gatewood et al., 2008) ▶ Considered a strong approach for job description, job classification, and job design (Levine et al., 1983) ▶ Well accepted by respondents and users (Levine et al., 1983) ▶ Requires a smaller sample size than many other methods (Levine et al., 1983) ▶ Results in quality information about the job (Fine, 1988; Levine et al., 1983) 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Process can be labor intensive and time consuming (Gatewood et al., 2008) ▶ Analysts must be specifically trained in the FJA approach (Gatewood et al., 2008) 	

Exhibit 15-1 (Continued)
Functional Job Analysis: Practice Description and Results





 Expert Evaluation 	
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely <p>▶ Because the model was developed to analyze all jobs in the United States labor market, FJA was designed to be comprehensive, standardized, and efficient (Brannick & Levine, 2002; Brannick et al., 2007)</p>	<ul style="list-style-type: none"> ▶ Has been in wide use in both the public and private sectors for decades (Fine, 1988) ▶ This is the approach that was used to develop the DOT. It is widely used and can be customized if additional data elements should be collected. ▶ FJA is a well-established method that is respected by job analysis experts. ▶ The procedure builds validity through the use of multiple methods, a structured framework, and structured protocols.
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ FJA is a well validated approach.</p>	<p>▶ Research indicated that FJA produces reliable ratings.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ FJA is highly respected by job analysis experts.</p>	<p>▶ The procedures used in the FJA approach can easily be trained to job analysts and do not require a background in job analysis.</p>

Exhibit 15-1 (Continued)
Functional Job Analysis: Practice Description and Results

 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p> <p>▶ Steps to increase confidentiality can be implemented, such as requiring analysts to sign a confidentiality document for each organization.</p>	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p> <p>▶ Because this is the method used to develop the DOT, it is highly likely that it would produce a strong return on investment.</p> <p>▶ FJA is a low cost procedure that requires minimal resources.</p>
<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p> <p>▶ This method was specifically developed to apply to all jobs in the national labor market.</p>	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p> <p>▶ SSA may desire more specific data that that typically produced by FJA; however, it is possible to tailor this approach to SSA's needs.</p>
<p>Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p> <p>▶ Collecting task data is a primary focus of FJA.</p>	<p>Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p> <p>▶ The FJA approach does not always involve collecting a comprehensive set of KSA data.</p>

Chapter 16: Job Element Model

This chapter provides a summary of the Job Element job analysis model. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. The JEM approach to job analyses takes advantage of multiple data collection procedures, which typically include reviewing written materials, interviews, self-reports (i.e., surveys and questionnaires), on-site observation, and automated collection of behavioral data.

Exhibit 16-1 Job Element Model: Practice Description and Results

The Job Element Model (JEM) is an existing job analysis model that focuses on the human attributes required for superior performance on the job. More specifically, JEM attempts to identify critical knowledges, skills, abilities, and other personal characteristics (KSAOs) required for performing work tasks (Sanchez & Levine, 2001). While JEM is similar to the Critical Incident Technique (CIT) in that it too focuses collecting information from workers with satisfactory performance, it can be contrasted with other job analysis procedures in that it bypasses the collection of task information or descriptions of the work and addresses the elements of the job (Gatewood, Feild, & Barrick, 2008). Elements typically include a range of job behaviors (e.g., interaction with others), intellectual behaviors (e.g., critical thinking/ reasoning), motor behaviors (e.g., sitting, standing, or walking), and work habits (e.g., multi-tasking). As a result, JEM is more commonly used to identify employee characteristics that should be assessed by selection measures for a job position rather than collecting information about the important tasks performed on the job (Gatewood, et al., 2008).

The first step in completing a job analysis using JEM is to identify the job elements necessary for success on the job. In the JEM, Knowledge refers to an organized piece of information, often a fact or procedure, which is directly applied to the performance of a function; Ability refers to a demonstrated competence to perform a behavior that results in an observable product; Skill refers to a competence to perform a learned, psychomotor act; and other personal characteristics refer to personality factors, attitudes, and values necessary to perform the job (Sanchez & Levine, 2001). In order to identify this information, a trained analyst selects a group of subject matter experts (SMEs), which may include incumbents and supervisors. These SMEs typically participate in two brainstorming sessions; the first session attempts to develop a tentative set of elements and sub-elements linked to satisfactory workers while the second session seeks to verify and improve or confirm the evaluations and definitions of these elements (Primoff & Eyde, 1988).

The second step involves rating the job elements (i.e., KSAOs) with a 2, 1, or 0 using the following four basic scales: 1) Barely acceptable (i.e., what relative proportion of even barely acceptable workers is good in the element?); 2) Superior (i.e., how important is the element in picking out the superior worker?); 3) Trouble (i.e., how much trouble is likely if the element is ignored when choosing among applicants?); and 4) Practical (i.e., to what extent can the organization fill its openings if the element is demanded?) (Sanchez & Levine, 2001; Brannick, & Levine, 2002).

Job Analysis Practice Highlights

- ▶ Applied to job analysis for around 30 years and is widely used in the public sector to develop selection measures in various trades and labor occupations
- ▶ Collects data from incumbents, supervisors, and other subject matter experts via focus groups, interviews, and surveys
- ▶ Collects a variety of data related to job elements, including Knowledges, Skills, and Abilities; Personality Characteristics; Importance/Frequency of Activity; Cognitive Demands; Physical Demands; and Other Work Habits
- ▶ Primarily used in Industrial/Organizational Psychology and Human Resources

Exhibit 16-1 (Continued)
Job Element Model: Practice Description and Results

The Job Element Model has been used for job analyses for around 30 years and it has been widely used in the public sector to develop selection measures in various trades and labor occupations. Similar to other models that rely on focus groups to collect data, there is the potential for logistical problems with this approach since it may be difficult to find high-level personnel who are available to participate. In addition, it may be a problem taking key members away from their work, especially within smaller organizations. The Job Element Method has also been criticized for lacking a focus on the specification of job tasks, which makes it difficult to identify elements necessary to do a specific task. Lastly, job analyst experts have rated JEM poorly in terms of both standardization and reliability (Levine, Ash, Hall, & Sistrunk, 1983).

Discipline(s)					
Physical and Occupational Therapy <input type="radio"/> Yes <input checked="" type="radio"/> No	Occupational Health <input type="radio"/> Yes <input checked="" type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input type="radio"/> Yes <input checked="" type="radio"/> No	Human Resources <input checked="" type="radio"/> Yes <input type="radio"/> No	Ergonomics <input type="radio"/> Yes <input checked="" type="radio"/> No
Quality & Data Considerations					
Level of Detail in Data Collected <input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise JEM seeks to identify specific knowledge, skills, abilities, and other personal characteristics that are necessary for successful performance on the job. These job elements involve a moderate amount of detail (Brannick & Levine, 2002; Brannick, Levine, & Morgeson, 2007).		Level of Job Performance Measured <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal JEM considers whether barely acceptable workers possess the job element, as well as whether the element distinguishes superior from average workers (Brannick & Levine, 2002; Brannick, et al., 2007).		Security of Data <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High Because JEM typically involves capturing data in hard copy (Gatewood et al., 2008; Primoff & Eyde, 1988), security of data is considered moderate. Although hard copy surveys introduce the possibility of data entry-errors, data should be reasonably secure if analysts are properly trained and procedures are followed correctly.	

Exhibit 16-1 (Continued)
Job Element Model: Practice Description and Results

Exhibit 16-1 (Continued)					
Job Element Model: Practice Description and Results					
Quality & Data Considerations (Continued)					
<p style="text-align: center;">Validity of Data</p> <p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High </p> <p>The validity of the data depends on the specific data collection procedures used. For example, a small focus group of subject matter experts creates opportunities for error in the analyst’s development of KSAOs. Also, surveys involve a moderate amount of subjectivity. However, there is evidence for the validity of JEM (Brannick & Levine, 2002; Brannick, et al., 2007; Jones, Steffy, & Bray, 1991; Primoff & Eyde, 1988).</p>	<p style="text-align: center;">Reliability of Data/ Standardization of Procedures</p> <p> <input checked="" type="radio"/> Low <input type="radio"/> Moderate <input type="radio"/> Complete </p> <p>The Job Elements Model is rated poorly in terms of both reliability and standardization (Levine et al., 1983). Depending on the data source, different lists of specifications may be developed. However, focus groups with participants in the same job allow for greater reliability as common elements may be easily identified (Jones et al., 1991; Levine et al., 1983).</p>	<p style="text-align: center;">Ease of Data Aggregation</p> <p> <input checked="" type="radio"/> Difficult <input type="radio"/> Moderate <input type="radio"/> Easy </p> <p>The ability to aggregate the data collected ranges from moderate to difficult. Subject matter Experts’ responses are analyzed and combined in various ways, some using rather complex formulas, to make more useful for human resource application (Brannick & Levine, 2002; Brannick, et al., 2007; Primoff & Eyde, 1988).</p>			
Data Source(s)					
<p style="text-align: center;">Incumbents</p> <p>Typically, six incumbents are included in focus groups to serve as subject matter experts (Brannick & Levine, 2002; Brannick, et al., 2007; Jones et al., 1991; Gatewood et al., 2008; Primoff & Eyde, 1988).</p>			<p style="text-align: center;">Direct Supervisors</p> <p>It is common to include direct supervisors in the focus groups with incumbents to provide an alternative perspective on the elements of the job (Brannick & Levine, 2002; Brannick, et al., 2007; Jones et al., 1991; Gatewood et al., 2008; Primoff & Eyde, 1988).</p>		
Target Data Collection Procedure(s)					
<p style="text-align: center;">Review of Written Mats.</p> <p> <input type="radio"/> Yes <input checked="" type="radio"/> No </p>	<p style="text-align: center;">Job Observation</p> <p> <input type="radio"/> Yes <input checked="" type="radio"/> No </p>	<p style="text-align: center;">Survey</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>	<p style="text-align: center;">Interview</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>	<p style="text-align: center;">Focus Groups</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>	<p style="text-align: center;">Assessment of Physical Demands</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>

Exhibit 16-1 (Continued)
Job Element Model: Practice Description and Results

Exhibit 16-1 (Continued)		
Job Element Model: Practice Description and Results		
Type of Data Collected		
<p align="center">Knowledges, Skills, & Abilities</p> <p>Job elements can include a variety of behaviors that draw on knowledge and abilities. Depending on the job, these work behaviors may assess an ability to recall facts, understanding of theory and instruments, and knowledge of basic math. The model attempts to identify specific KSAOs that are necessary for superior performance on the job (Brannick & Levine, 2002; Brannick et al., 2007; Jones et al., 1991).</p>	<p align="center">Personality Characteristics</p> <p>In JEM, focus group participants are asked to describe personality characteristics, such as reliability, dependability, and work habits (e.g., willingness to take on extra work) that could be used to identify superior workers (Brannick & Levine, 2002; Brannick et al., 2007; Jones et al., 1991).</p>	<p align="center">Importance/Frequency of Activity</p> <p>One of the key steps in the JEM approach to job analysis involves applying ratings scales to each job element identified. These scales include the importance for performing barely acceptable work, importance for selecting superior workers, trouble likely if the element is ignored in selection, and the extent to which the element is practical to expect in the applicant population. All scales are rated with three response categories (i.e., 2, 1, or 0) (Brannick & Levine, 2002; Brannick et al., 2007; Primoff & Eyde, 1988; Sanchez & Levine, 2001).</p>
<p align="center">Task Descriptions</p> <p>Job elements may also include tasks on the job, such as recognizing tools and their uses, reading blue prints, and computing means and standard deviations (Brannick & Levine, 2002; Brannick et al., 2007; Primoff & Eyde, 1988).</p>	<p align="center">Physical Demands</p> <p>Job elements often include motor elements, so the collection of physical demands is also common. Depending on the job, motor elements may include characteristics such as coordination (e.g., manipulation of tools) and strength and stamina as in handling heavy objects (Primoff & Eyde, 1988).</p>	<p align="center">Other Types of Data Collected</p> <p>Work habits, such as taking initiative, working independently, and willingness to take an overload of work are typically considered as job elements (Primoff & Eyde, 1988).</p>

Exhibit 16-1 (Continued)
Job Element Model: Practice Description and Results

Resources Needed		
<p align="center">Length of Time to Develop</p> <p><input type="radio"/> Short (e.g., less than 1 month)</p> <p><input checked="" type="radio"/> Medium (e.g., 1 to 6 months)</p> <p><input type="radio"/> Long (e.g., 6 months or longer)</p> <p>It takes a moderate amount of time to identify the exact data collection procedures and specify the logistics (e.g., analyst training, interview/focus group protocols, data documenting) surrounding each procedure.</p>	<p align="center">Monetary Cost to Develop</p> <p><input checked="" type="radio"/> Inexpensive</p> <p><input type="radio"/> Moderate</p> <p><input type="radio"/> Expensive</p> <p>JEM is generally inexpensive in terms of monetary cost to develop, as no technical or expensive equipment is needed.</p>	
<p align="center">Length of Time to Administer</p> <p><input type="radio"/> Short (e.g., less than 2 hours)</p> <p><input type="radio"/> Medium (e.g., 2 hours to 5 hours)</p> <p><input checked="" type="radio"/> Long (e.g., 5 hours or longer)</p> <p>The amount of time needed to administer may vary depending on the method(s) applied to the data collection process. However, the preferred method typically involves two focus groups sessions that last between 3 to 5 hours (Brannick & Levine, 2002; Brannick et al., 2007).</p>	<p align="center">Monetary Cost to Administer</p> <p><input checked="" type="radio"/> Inexpensive</p> <p><input type="radio"/> Moderate</p> <p><input type="radio"/> Expensive</p> <p>JEM is generally inexpensive in terms of monetary cost to administer and is less expensive to administer compared to come of the other job analysis models (Jones et al., 1991; Levine et al., 1983).</p>	
Data Documenting Resource(s)		
<p align="center">Hard Copy/Structured Note Pages Notes</p> <p>The analyst should document via hard copy notes the discussions that occur during the focus group or responses provided during the interview with subject matter experts (Gatewood et al., 2008; Primoff & Eyde, 1988).</p>	<p align="center">Work/Job Analysis Instrument</p> <p>Each SME is provided a Job Element Blank to rate elements and sub-elements for significance. The Job Element Blank is not a standardized instrument—the elements listed on it are specific to the job. In the Job Element Blank, each element is rated in terms of the following: 1) marginal behavior (i.e., the number of barely acceptable workers who have it); 2) superior behavior (i.e., the number of superior workers who have it); 3) behavior likely to cause trouble if not considered; and 4) element practicality (i.e., whether applicants can be expected to have this element (Primoff & Eyde, 1988).</p>	<p align="center">Voice Recorder</p> <p>Though not necessary, the analyst may find it helpful to record the incumbent's responses to questions asked during the focus group or interviews to serve as a resource to refer back to during the job analysis (Brannick & Levine, 2002; Brannick et al., 2007).</p>

Exhibit 16-1 (Continued)
Job Element Model: Practice Description and Results

Exhibit 16-1 (Continued) Job Element Model: Practice Description and Results	
Resources Needed (Continued)	
<i>Additional Resource(s) Needed</i>	
<p>Meeting Space</p> <p>The job analyst may meet an incumbent at the job site or a previously-designated meeting space to facilitate the focus group or conduct an interview (Brannick & Levine, 2002; Brannick et al., 2007).</p>	
Pros/Cons	Pros/Cons
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Been applied to job analysis for around 30 years and is widely used in the public sector to develop selection measures in various trades and labor occupations (Gatewood et al., 2008) ▶ Provides easy and systematic procedures for identifying critical psychological characteristics of workers in an occupational group by using expert judgments of incumbents and supervisors (Primoff & Eyde, 1988) ▶ Other job analysis models and procedures restricted to narrow tasks often ignore this type of data. (Primoff & Eyde, 1988). ▶ Useful for developing work sample tests (Brannick & Levine, 2002; Brannick et al., 2007) ▶ Does not require a large sample size, and often less expensive to administer than some of the other job analysis models (Levine et al., 1983) ▶ This approach to job analysis supports work sample test development, which is an important persons-assessment tool for rehabilitation professionals to answer SSA inquiries about the applicant's ability to perform work. 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Viewed more as a means for identifying employee characteristics that should be assessed by selection measures for a job position rather than as a means for collecting information about the important tasks performed on the job (Gatewood et al., 2008) ▶ Since data are often collected from high-level personnel, there is the potential for problems with finding similar availability among participants. Furthermore, there may be a problem with taking key members away from their work, especially within smaller organizations (Gatewood et al., 2008) ▶ Rated poorly by experts for the purpose of job design and is rated as having a lower-quality outcome than other job analysis methods (Levine et al., 1983) ▶ Criticized for lacking a focus on the specification of job tasks, which makes it difficult to identify elements necessary to do a specific task (Gatewood et al., 2008)

Exhibit 16-1 (Continued)
Job Element Model: Practice Description and Results





 Expert Evaluation 	
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <p>▶ Experts have previously rated this model low in terms of reliability and standardization, so in order to be legally defensible, these claims would need to be refuted.</p>	<ul style="list-style-type: none"> ▶ Applied to job analysis for around 30 years and is widely used in the public sector to develop selection measures in various trades and labor occupations (Sanchez & Levine, 2001). ▶ Rated poorly by experts for the purpose of job design and is rated as having a lower-quality outcome than other job analysis methods (Levine et al., 1983)
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Job analysis experts have indicated some concern over the reliability of JEM, which would impact its ability to collect valid data.</p>	<p>▶ Job analysis experts have indicated some concern over the reliability of JEM.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Some job analysis experts have criticized the JEM approach for issues such as its reliability, lack of focus on task data, and the quality of its outcome.</p>	<p>▶ Although JEM involves several data collection procedures, it is likely that job analysts could be trained on this approach.</p>

Exhibit 16-1 (Continued)
Job Element Model: Practice Description and Results

 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p>	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>
<p>▶ Steps to increase confidentiality can be implemented, such as requiring analysts to sign a confidentiality document for each organization.</p>	<p>▶ Although JEM is a low cost approach, it involves a significant amount of time to administer.</p>
<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>
<p>▶ JEM is applicable to a variety of occupations.</p>	<p>▶ JEM collects a moderate level of detail, which may not be precise enough for SSA's needs.</p>
<p>Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>	<p>Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>
<p>▶ JEM is a worker-oriented approach that does not typically collect task data; however, some job elements are related to work activities.</p>	<p>▶ JEM's focus is on high performance on the job, rather than SSA's need of obtaining data on minimally-necessary abilities; however, it is possible that this could be adjusted.</p>

Chapter 17: Occupational Information Network (O*NET)

This chapter provides a summary of the Occupational Information Network (O*NET) job analysis model. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. The data included in O*NET were collected using a variety of data collection procedures including using a structured questionnaire as the primary data collection procedure as well as by reviewing written materials, specifically the Dictionary of Occupational Titles, and conducting interviews with organizational representatives.

Exhibit 17-1

O*NET: Practice Description and Results

In a job analysis context, the Occupational Information Network (O*NET) is typically used as a source of background information for job analyses (Brannick & Levine, 2002; Brannick et al., 2007). Individuals who are conducting interviews or job observations can look to O*NET before doing so in order to learn about the job they will be analyzing before actually meeting with incumbents or supervisors (Brannick & Levine, 2002; Brannick et al., 2007). While using O*NET as an information tool is not a job analysis model, the large-scale effort associated with the development of O*NET can be informative as a job analysis model. Therefore, the rest of this chapter is based on based on the methodology used in the development and updating of O*NET rather than on using O*NET as a source of background information.

O*NET is a comprehensive, flexible system that is used to collect occupational information (Lewis, Rivkin, & Frugoli, 2011). The O*NET questionnaire collects data regarding characteristics of both the worker and the job (Peterson, Mumford, Borman, Jeaneret, & Fleishman, 1995, 1999; Peterson, Mumford, Borman, Jeanneret, Fleishman, Levin, et al., 2001; Peterson & Sager, 2010). The information about worker-oriented characteristics includes: 1) worker characteristics (e.g., abilities, interests, and values); 2) worker requirements (e.g., knowledge, skills, and education); and 3) experience requirements (e.g., training, licensing, and skills needed at job entry). The job-oriented characteristics represented in O*NET include 1) occupational requirements (e.g., generalized work activities, detailed work activities, and work context); 2) labor market characteristics (e.g., labor market information and occupational outlook); and 3) occupational-specific information (e.g., tasks, tools, and technology) (Peterson et al., 2001; Peterson & Sager, 2010). Originally items on the O*NET questionnaire were rated on three different types of scales: level of the characteristic needed, importance, and frequency. These ratings were only gathered on the items for which they were relevant (e.g., frequency ratings were not requested for skills) (Peterson et al., 1999). However, in updates to O*NET, the questions asked have changed. In the new O*NET questionnaire, if the respondent indicates that an item is not important to the job, then the question about the level needed is not asked. Additionally, the updated O*NET questionnaire does not include items about frequency (Peterson & Sager, 2010).

Job Analysis Practice Highlights

- ▶ Includes a very comprehensive set of job descriptors
- ▶ Collects data mainly through surveys
- ▶ Collects a variety of data including Task Descriptions, Knowledges, Skills, & Abilities, Personality Characteristics, Environmental Conditions/Work Context, Training & Educational Requirements, Physical Demands, Minimum Entry Qualifications, Cognitive Demands, Importance/Frequency Ratings and Other data
- ▶ Used in Physical and Occupational Therapy, Industrial/Organizational Psychology, and Vocational Rehabilitation

Exhibit 17-1 (Continued)
O*NET: Practice Description and Results

The principal means of data collection for O*NET is this standardized questionnaire (Peterson et al., 2001; Peterson & Sager, 2010). To identify incumbents, a database is used to identify organizations employing specific occupations. An O*NET employee then contacts the organization to identify employees appropriate to complete the survey and a random sample of these incumbents is selected for actual survey completion (Lewis et al., 2011). Incumbents completing the questionnaire receive only a portion of the items that are included in the O*NET content model as to reduce burden on the respondents and therefore increase response rate (Peterson et al., 1999; Peterson & Sager, 2010). When choosing incumbents to complete questionnaires, the goal was to obtain 30 incumbent responses per job examined for each measure (Peterson et al., 1999). Additionally, while waiting to receive responses from incumbent questionnaires, job analysts used information provided in the Dictionary of Occupational Titles in order to rate jobs (Peterson et al., 2001).



Discipline(s)					
Physical and Occupational Therapy <input checked="" type="radio"/> Yes <input type="radio"/> No	Occupational Health <input type="radio"/> Yes <input checked="" type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input checked="" type="radio"/> Yes <input type="radio"/> No	Human Resources <input type="radio"/> Yes <input checked="" type="radio"/> No	Ergonomics <input type="radio"/> Yes <input checked="" type="radio"/> No

Exhibit 17-1 (Continued)
O*NET: Practice Description and Results

Quality & Data Considerations		
<p align="center">Level of Detail in Data Collected</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> General <input type="radio"/> Moderate <input type="radio"/> Precise <p>The O*NET Content model includes items about general work activities and worker attributes necessary for the job. These generalized work statements are broader than task statements that are often collected using other job analysis practices. Additionally, the data collected for O*NET are fairly general because the same questionnaire must be applicable to a wide variety of jobs. O*NET data is not meant to provide detailed information about a specific job (Brannick & Levine, 2002; Brannick et al., 2007; Fine, Harvey, & Cronshaw, 2004; Peterson et al., 1995, 1999; Peterson et al., 2001, Sanchez & Levine, 2001).</p>	<p align="center">Level of Job Performance Measured</p> <ul style="list-style-type: none"> <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal <p>O*NET provides information on how the job is typically performed as questions on the questionnaire ask about importance to performing the job rather than specifying the performance level as the minimum to get by or to be a top performer (Brannick & Levine, 2002; Brannick et al., 2007).</p>	<p align="center">Security of Data</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Low <input type="radio"/> Moderate <input type="radio"/> High <p>Originally, the O*NET questionnaire was only sent in hard copy format through the mail. It is now available in an online-format, but 75% of respondents still complete the hard copy questionnaire. Additionally, the data in O*NET are publically available (Brannick & Levine, 2002; Brannick et al., 2007; Lewis et al., 2011; Peterson et al., 1995, 1999; Peterson et al., 2001).</p>

Exhibit 17-1 (Continued)
O*NET: Practice Description and Results

Quality & Data Considerations (Continued)

	Quality & Data Considerations (Continued)			
<p>Validity of Data</p> <ul style="list-style-type: none"> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High <p>Because of the questionnaire format used to collect O*NET data, there are few opportunities for error to be introduced to the ratings. Additionally, rating scales were developed to be valid by making the scales non-technical, testing them using a variety of jobs, and review of the scales by experienced occupational analysts. However, some personal judgment can be introduced due to the subjective nature of the rating scales (Harvey, 2009; Peterson et al., 1995, 1999; Peterson et al., 2001).</p>	<p>Reliability of Data/ Standardization of Procedures</p> <ul style="list-style-type: none"> <input type="radio"/> Low <input type="radio"/> Moderate <input checked="" type="radio"/> Complete <p>Because O*NET data are collected using a paper and pencil survey, questions are always presented in the same language for all incumbents completing the survey. However, for data collection a rotational design was used in administering surveys (e.g., different respondents received different sets of questions to reduce the time burden) (Peterson et al., 1995, 1999; Peterson et al., 2001).</p>	<p>Ease of Data Aggregation</p> <ul style="list-style-type: none"> <input type="radio"/> Difficult <input type="radio"/> Moderate <input checked="" type="radio"/> Easy <p>The O*NET questionnaire includes Likert-type scales which must be cleaned and coded before the data can be entered (Peterson et al., 1995, 1999; Peterson et al., 2001), but is relatively easy to aggregate due to the nature of the data.</p>		

Data Source(s)



	<p>Incumbents</p> <p>Job incumbents can complete the O*NET questionnaire. Incumbents chosen to complete the questionnaire should have at least a sixth grade reading level (Peterson et al., 1995, 1999; Peterson et al., 2001)</p>	<p>Direct Supervisors</p> <p>Direct supervisors of the position being analyzed can complete the O*NET questionnaire in order to provide data about the job. In order to complete the questionnaire, supervisors should have at least a sixth grade reading level (Peterson et al., 1995).</p>	
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Exhibit 17-1 (Continued)
O*NET: Practice Description and Results

Data Source(s) (Continued)					
Human Resource Professionals Organizational representatives, typically from the Human Resources department, are used as a source of data by participating in phone interviews in order to provide organizational data, which serves as a screening tool for where to send questionnaires to solicit incumbent responses. These individuals also help to identify appropriate employees within the organization to complete the O*NET questionnaire (, Lewis et al., 2011; Peterson et al., 2001).			Other Data Source Analysts, specifically Department of Labor analysts, occupational analysts, and Industrial-Organizational psychology graduate students, also rated occupations using the O*NET questionnaire (Peterson et al., 2001; Peterson & Sager, 2010, Lewis et al., 2011). Additionally, web-based research is conducted in order to collect information about work activities, tasks, tools, and technologies relevant to the job (Lewis et al., 2011).		
Target Data Collection Procedure(s)					
Review of Written Mats. <input checked="" type="radio"/> Yes <input type="radio"/> No	Job Observation <input type="radio"/> Yes <input checked="" type="radio"/> No	Survey <input checked="" type="radio"/> Yes <input type="radio"/> No	Interview <input checked="" type="radio"/> Yes <input type="radio"/> No	Focus Groups <input type="radio"/> Yes <input checked="" type="radio"/> No	Assessment of Physical Demands <input checked="" type="radio"/> Yes <input type="radio"/> No
Type of Data Collected					
Task Descriptions The O*NET questionnaire includes items about generalized work activities such as getting information necessary to do the job, evaluating information, and estimating or judging. Work is also being done to add over 2,000 detailed work activities to the questionnaire that are related to the generalized work activities but more detailed and specific to occupations (Brannick & Levine, 2002; Brannick et al., 2007; Lewis et al., 2011; Peterson et al., 1995, 1999; Peterson et al., 2001).		Knowledges, Skills, & Abilities The O*NET questionnaire includes items about abilities, such as oral comprehension, fluency of ideas, and mathematical reasoning. It also includes items about skills, such as active listening, critical thinking, persuasion, and technical skills as well as items about 33 knowledge areas such as mathematics, business, and sales (Brannick & Levine, 2002; Brannick et al., 2007; Peterson et al., 1995, 1999; Peterson et al., 2001).		Personality Characteristics The O*NET questionnaire includes items about worker values, such as needing a feeling for accomplishment, fairness, and independence. It also includes items about personal characteristics such as persistence, initiative, and concern for others (Brannick & Levine, 2002; Brannick et al., 2007; Peterson et al., 1995, 1999; Peterson et al., 2001).	

Exhibit 17-1 (Continued)
O*NET: Practice Description and Results

Type of Data Collected (Continued)

<p align="center">Environmental Conditions/Work Context</p> <p>The O*NET questionnaire includes items about the work context, such as items about interpersonal relationships, physical work conditions (e.g., work location and environmental conditions), structural job characteristics, and job hazards (Brannick & Levine, 2002; Brannick et al., 2007; Peterson et al., 1995, 1999; Peterson et al., 2001).</p>	<p align="center">Training & Educational Requirements</p> <p>The O*NET Content Model includes items about education required for the job including level of education, coursework, and educational program as well as items about necessary training, such as on-the-job training or apprenticeships (Brannick & Levine, 2002; Brannick et al., 2007; Peterson et al., 1995, 1999; Peterson et al., 2001).</p>	<p align="center">Physical Demands</p> <p>The O*NET Content Model includes items about physical demands such as handling and moving objects, body positions, repetitive motions, body coordination, and body flexibility (Peterson et al., 1995; Peterson et al., 2001).</p>
<p align="center">Minimum Entry Qualifications</p> <p>The O*NET questionnaire includes items about minimum entry qualifications such as any licenses, certificates, or registrations necessary for the job. It also includes items about any previous experience necessary to perform the job (Peterson et al., 1995, 1999; Peterson et al., 2001).</p>	<p align="center">Cognitive Demands</p> <p>The O*NET questionnaire includes items about cognitive demands, such as dealing with distractions, reasoning/decision making, and problem solving (Peterson et al., 1995; Peterson et al., 2001).</p>	<p align="center">Importance/Frequency Ratings</p> <p>O*NET attributes are rated on importance (i.e., the impact that the attribute has on job performance), and level of the characteristic needed to perform the job (Peterson et al., 1995, 1999; Peterson et al., 2001; Peterson & Sager, 2010).</p>
<p align="center">Other Data Collected</p> <p>The O*NET questionnaire also includes items about the organizational context, such as industry, organizational structure, and human resource practices, compensation and benefits information, and items about the labor market, such as labor supply and demand (Lewis et al., 2011; Peterson et al., 1995; Peterson et al., 2001).</p>		

Exhibit 17-1 (Continued)
O*NET: Practice Description and Results

Resources Needed	
<p align="center">Length of Time to Develop</p> <ul style="list-style-type: none"> <input type="radio"/> Short (e.g., less than 1 month) <input checked="" type="radio"/> Medium (e.g., 1 to 6 months) <input type="radio"/> Long (e.g., 6 months or longer) <p>Development of the O*NET occupational information system took two years (Peterson et al., 1999). However, this includes time to develop the questionnaire as well as to request and receive data from incumbents, so the actual development time is significantly less than this 2 year estimate. Because of the comprehensive nature of the questionnaire content as well as the rotational design used in administering the surveys, it likely took a medium amount of time to develop the procedures for developing the O*NET database (Peterson et al., 1999; Peterson & Sager, 2010).</p>	<p align="center">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>The O*NET data collection system is intact and the database is updated by DOL.</p>
<p align="center">Length of Time to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (e.g., less than 2 hours) <input type="radio"/> Medium (e.g., 2 hours to 5 hours) <input type="radio"/> Long (e.g., 5 hours or longer) <p>When administering questionnaires for the development of O*NET, questionnaires took approximately 60-90 minutes to complete. For O*NET updates, incumbents take approximately 25-30 minutes to complete the questionnaire (Lewis et al., 2011; Peterson et al., 1999).</p>	<p align="center">Monetary Cost to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>O*NET data collection system is intact and the database is updated by DOL. It is a cost-effective means to collect organizational and worker data (Lewis et al., 2011).</p>

Exhibit 17-1 (Continued)
O*NET: Practice Description and Results

Resources Needed (Continued)		
<i>Data Documenting Resource(s)</i>		
<p align="center">Work/Job Analysis Instrument</p> <p>The O*NET Content Model questionnaire is required in order to collect data from incumbents, supervisors, or analysts about requirements for the job (Peterson et al., 1995, 1999; Peterson et al., 2001). It can be completed either in a paper-and-pencil format or using a web-based version (Lewis et al., 2011). The O*NET questionnaire includes 41 generalized work activities, 120 knowledges, skills, and abilities, 16 work styles or personal characteristics, 57 work context questions, as well as questions about required education, training, and experience (O*NET Resource Center). Most of these items are rated on Likert-type scales, with the remainder of the items being checklists (e.g., check all types of training that apply to the job). The Likert rating scales include ratings of level needed for the job and importance to job performance. Generalized work activities were also rated on a frequency scale on the original O*NET questionnaire (Peterson et al., 1995; Peterson et al., 1999; Peterson & Sager, 2010). Revisions have simplified the questionnaire and reduced the number of items as well as the number of scales for each item (Lewis et al., 2011).</p>	<p align="center">Computer Software</p> <p>Computer software is used to enter the job analysis data (Peterson et al., 2001).</p>	
<i>Additional Resource(s) Needed</i>		
<p align="center">Telephone Access</p> <p>Telephone access is necessary in order to conduct interviews with organizational representatives about their organization and the jobs being analyzed (Peterson et al., 2001).</p>	<p align="center">Computer</p> <p>The interviews conducted with the organizational representatives were Computer-Assisted Telephone interviews, which require the use of a computer (Peterson et al., 2001).</p>	<p align="center">Access to Organizational Materials</p> <p>Access to organizational materials, such as job descriptions and training materials, is needed in order to conduct a review of written materials (Carlisle, 1986; Gael, 1990).</p>

Exhibit 17-1 (Continued)
O*NET: Practice Description and Results



 Pros/Cons	
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ One questionnaire form can be used for a variety of occupations (Peterson et al., 1995; Peterson et al., 2001) ▶ O*NET uses incumbent-reported data rather than analyst data, which significantly reduces the cost necessary to collect large-scale data (Peterson et al., 2001) ▶ The O*NET Content Model includes a comprehensive listing of job attributes (Peterson et al., 2001) ▶ O*NET allows for meaningful comparisons across jobs because the same information concerning work characteristics is collected for all jobs (Levy, 2009) ▶ The O*NET instrument and the O*NET database are continually updated by the DoL; the average currency of occupations is 2.59 years (Lewis et al., 2011). ▶ Reports are readily available at ononline.org. 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Because incumbents are responding to the questionnaire about their own jobs, they may respond in a socially-desirable way (Peterson et al., 2001) ▶ Respondents may be overwhelmed with the amount of data that they need to provide (Peterson et al., 2001) ▶ The construct validity of the O*NET surveys is questionable as the traits measured are not empirically distinct from one another as suggested (Harvey & Wilson, 2010) ▶ Single item rating scales used in the O*NET surveys are undesirable (Harvey & Wilson, 2010; Harvey, 2007; Gibson, 2002) ▶ Interrater agreement for many occupations has been shown to be low using the O*NET scales, which brings into question the quality and accuracy of the data (Harvey, 2009; Harvey, 2007, Hollander & Harvey, 2002) ▶ O*NET was not designed to address many HR functions, such as disability determination (Fine et al., 2004) ▶ Use of the questionnaire alone would provide information at a level of abstraction that might not be suitable for SSA. ▶ Scores on individual O*NET items may not provide appropriate details at the lower end of the worker requirements continuum, where many of the jobs potentially held by claimants would lie. ▶ Because O*NET is based on a specific content model which is examined using a standardized instrument, the content model might not include information necessary for disability determination and the instrument might not include the necessary details. ▶ The data in O*NET that focus on physical demands are insufficient in detail.





Exhibit 17-1 (Continued) O*NET: Practice Description and Results	
 Expert Evaluation 	
<p>Likelihood Practice will Be Legally Defensible</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>	<p>▶ The validity of O*NET has been demonstrated during the development of the system and during data collection (Peterson & Sager, 2010)</p> <p>▶ While O*NET would be defensible in many instances, it may not suit SSA's purposes and therefore, may not be defensible for SSA if used alone.</p>
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p>	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p>
<p>▶ There is research support for the validity of the O*NET approach.</p>	<p>▶ This standardized approach is likely to lead to high reliability.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p>	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p>
<p>▶ The large scale effort involved in the development of O*NET involved input from a variety of job analysis experts; thus, this approach is likely to be perceived as highly credible.</p>	<p>▶ This is a straightforward approach that would be easy to train.</p>

Exhibit 17-1 (Continued)
O*NET: Practice Description and Results

Expert Evaluation (Continued)	
	
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p> <p>▶ This practice is minimally intrusive for organizations and is likely to provide confidentiality.</p>	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p> <p>▶ This approach requires minimal resources to implement.</p>
<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p> <p>▶ The O*NET approach was designed to apply to all jobs in the national labor market.</p>	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <p> <input type="radio"/> Very Unlikely <input checked="" type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p> <p>▶ Because the data are mostly collected through surveys, this approach lacks the flexibility to collect very specific data as in some other data collection procedures (e.g., job observation).</p>
<p>Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p> <p>▶ The O*NET approach collects information about generalized work activities but not about specific tasks.</p>	<p>Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p> <p>▶ Some scales are aimed at the upper levels of abilities and thus might not be effective at obtaining the level information for jobs commonly done by SSA claimants.</p>

Chapter 18: Position Analysis Questionnaire (PAQ)

This chapter provides a summary of the Position Analysis Questionnaire (PAQ) job analysis method. The information presented below is based on research collected through 117 literature review articles and 12 focus groups. The full PAQ method combines multiple data collection procedures, which typically include an interview and job observation at minimum, but also may consist of a review of written materials, a pre-interview questionnaire, and focus groups.

Exhibit 18-1

Position Analysis Questionnaire: Practice Description and Results

The Position Analysis Questionnaire (PAQ) is an existing job analysis model that uses a standardized 195-item questionnaire to collect data in 6 areas: 1) information input (e.g., visual sources of job); 2) mental processes (e.g., reasoning, planning, decision-making or information processing necessary to perform activities); 3) work output (e.g., physical activities performed and tools used); 4) relationships with other people (e.g., relationships with other people required to perform job); 5) job context (e.g., physical and social contexts work is performed), and 6) other job characteristics (e.g., other activities or characteristics relevant to the job, such as apparel required and work schedule) (McPhail, Jeanneret, McCormick, & Mecham, 2004; Sanchez & Levine, 2001). Items on the PAQ are rated using several different Likert-type rating scales that capture the extent of use, importance to the job, amount of time, possibility of occurrence, applicability, and some item-specific scales (e.g., difficulty) (McPhail et al., 2004; Sanchez & Levine, 2001).

To complete the PAQ, trained job analysts collect data via an interview and job observation, at minimum, but also may collect data via a review of written materials, a pre-interview questionnaire, and focus groups. The analyst takes hard copy notes on all data collected and uses that information to complete the standardized PAQ questionnaire. The completed questionnaires can be sent to PAQ services for computerized scoring (McPhail et al., 2004; Sanchez & Levine, 2001). A profile for the job that results from the computerized scoring can be compared to a database of benchmark jobs (Sanchez & Levine, 2001). The PAQ can be completed in as little as 2-3 hours, depending on the length of job observation and number of data collection procedures.

The PAQ has been researched extensively and is one of the most useful of the standardized job analysis instruments (Sanchez & Levine, 2001). The PAQ is highly regarded because of its standardization, its readiness for use, the usability of its scales, and its low sample size requirements (McCutcheon, 2004).

Job Analysis Practice Highlights

- ▶ Very well-regarded in Job Analysis community
- ▶ Collects data mainly via Job Observation and Interview.
- ▶ Collects Task Descriptions; Tools, Equipment, and Work Aides; Environmental Conditions/Work Context; Physical Demands; Cognitive Demands; Training & Educational Requirements; Importance/Frequency Ratings; and Other data.
- ▶ Used in Industrial/Organizational Psychology, Vocational Rehabilitation, and Human Resources.

Exhibit 18-1 (Continued) Position Analysis Questionnaire: Practice Description and Results					
Discipline(s)					
Physical and Occupational Therapy <input type="radio"/> Yes <input checked="" type="radio"/> No	Occupational Health <input type="radio"/> Yes <input checked="" type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input checked="" type="radio"/> Yes <input type="radio"/> No	Human Resources <input checked="" type="radio"/> Yes <input type="radio"/> No	Ergonomics <input type="radio"/> Yes <input checked="" type="radio"/> No
Quality & Data Considerations					
Level of Detail in Data Collected <input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise The PAQ gathers data on many specific job aspects. Job information is rated on Likert-type scales as part of 195-item work analysis instrument. The PAQ does not, however, require exact measurements of job data (e.g., physical demands) or necessitate specific task descriptions (Jones, Steffy, & Bray, 1991; McPhail et al., 2004).		Level of Job Performance Measured <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal The average of PAQ ratings across multiple incumbents in the same position is taken to assess the most accurate and reliable description of the typical position (McPhail et al., 2004).		Security of Data <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High Although the data collected throughout the job analysis process are documented via hard copy notes, information may be prepared for processing by making ratings on the PAQ directly on the Internet at www.PAQ.com or by PAQ services (McPhail et al., 2004).	

Exhibit 18-1 (Continued)					
Position Analysis Questionnaire: Practice Description and Results					
Quality & Data Considerations (Continued)					
<p style="text-align: center;">Validity of Data</p> <p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High </p> <p>Each item in the PAQ is rated on a specific rating scale, but the data collection processes allow some opportunities for judgment (Brannick & Levine, 2002; Brannick, Levine, & Morgeson, 2007; Jones et al., 1991; McPhail et al., 2004).</p>	<p style="text-align: center;">Reliability of Data/ Standardization of Procedures</p> <p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> Complete </p> <p>The same PAQ items are rated for every position analyzed, but features of the data collection procedures (e.g., interview questions) may be adapted by the job analyst depending on the situation and information not yet collected (Brannick & Levine, 2002; Brannick, Levine, & Morgeson, 2007; Jones et al., 1991; Levine, Ash, Hall & Sistrunk, 1983; McPhail et al., 2004).</p>	<p style="text-align: center;">Ease of Data Aggregation</p> <p> <input type="radio"/> Difficult <input type="radio"/> Moderate <input checked="" type="radio"/> Easy </p> <p>Ratings on the PAQ can be combined numerically based on the pre-designated scale for each item (Brannick & Levine, 2002; Brannick, Levine, & Morgeson, 2007; Gael, 1988; Jones et al., 1991; McPhail et al., 2004).</p>			
Data Source(s)					
<p style="text-align: center;">Incumbents</p> <p>Incumbents may complete a pre-interview questionnaire or be the object of an interview and/or job observation (Brannick & Levine, 2002; Brannick, Levine, & Morgeson, 2007; Gatewood, Feild, & Barrick, 2008; Jones et al., 1991; McCormick & Jeanneret, 1988; McPhail et al., 2004).</p>	<p style="text-align: center;">Organizational Materials</p> <p>Organizational Materials include position descriptions, organizational charts, or training materials (Jones et al., 1991; McPhail et al., 2004).</p>	<p style="text-align: center;">Direct Supervisors</p> <p>Direct supervisors can provide an overview of key functions performed or review the accuracy and reliability of job analysis ratings (Gatewood et al., 2008; Jones et al., 1991; McCormick & Jeanneret, 1988; McPhail et al., 2004).</p>			
Target Data Collection Procedure(s)					
<p>Review of Written Mats.</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>	<p>Job Observation</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>	<p>Survey</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>	<p>Interview</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>	<p>Focus Groups</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>	<p>Assessment of Physical Demands</p> <p> <input checked="" type="radio"/> Yes <input type="radio"/> No </p>

Exhibit 18-1 (Continued)
Position Analysis Questionnaire: Practice Description and Results

Type of Data Collected		
<p align="center">Task Descriptions</p> <p>The PAQ contains items that assess and describe tasks, such as estimation activities (e.g., inspecting), decision making, reasoning, and planning/scheduling, manual activities (e.g., assembling/ disassembling), oral communication, and written or print communications (Jones et al., 1991; McPhail et al., 2004).</p>	<p align="center">Tools, Equipment, & Work Aides</p> <p>The PAQ contains items that assess and describe tools, equipment, and work aids used by job incumbents, such as measuring devices, mechanical devices, hand-held tools or instruments, use of other hand-held devices, use of stationary devices, use of control devices, transportation and mobile equipment, and apparel worn (Gatewood et al., 2008; Jones et al., 1991; McCormick & Jeanneret, 1988; McPhail et al., 2004).</p>	<p align="center">Environmental Conditions/Work Context</p> <p>The PAQ contains items that assess and describe the job context, such as outside physical working conditions, indoor physical working conditions, physical hazards, and personal and social aspects of each job (Brannick & Levine, 2002; Brannick et al., 2007; Gatewood et al., 2008; Jones et al., 1991; McCormick & Jeanneret, 1988; McPhail et al., 2004; Robinson, 2009).</p>
<p align="center">Physical Demands</p> <p>The PAQ contains items that assess and describe physical demands, such as sensory perceptual processes (e.g., body balance), full body activities, level of physical exertion, body positions and postures, and manipulation and coordination activities (Brannick & Levine, 2002; Brannick et al., 2007; Jones et al., 1991; McCormick & Jeanneret, 1988; McPhail et al., 2004; Robinson, 2009).</p>	<p align="center">Cognitive Demands</p> <p>The PAQ contains items that assess and describe cognitive demands, such as information processing activities, short-term memory and time pressure (Brannick & Levine, 2002; Brannick et al., 2007; Gatewood et al., 2008; Jones et al., 1991; McCormick & Jeanneret, 1988; McPhail et al., 2004; Robinson, 2009).</p>	<p align="center">Training & Educational Requirements</p> <p>The PAQ contains items that assess and describe education, job related experience, and training of incumbents (McPhail et al., 2004).</p>

Exhibit 18-1 (Continued)
Position Analysis Questionnaire: Practice Description and Results

Type of Data Collected (Continued)	
<p align="center">Importance/Frequency Ratings</p> <p>The PAQ has six rating scales: 1) Extent of Use; 2) Importance to This Job; 3) Amount of Time; 4) Possibility of Occurrence; 5) Applicability; and 6) Item-Specific scales (e.g., Difficulty) (Gatewood et al., 2008; Jones et al., 1991; McCormick & Jeanneret, 1988; McPhail et al., 2004; Robinson, 2009).</p>	<p align="center">Other Types of Data Collected</p> <p>The PAQ also contains items that measure work schedule, pace, travel, compensation, and exempt status (Brannick & Levine, 2002; Brannick et al., 2007; Gatewood et al., 2008; Jones et al., 1991; McCormick & Jeanneret, 1988; McPhail et al., 2004).</p>
Resources Needed	
<p align="center">Length of Time to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (e.g., less than 1 month) <input type="radio"/> Medium (e.g., 1 to 6 months) <input type="radio"/> Long (e.g., 6 months or longer) <p>The PAQ is an off-the-shelf approach that can be used for any job without additional development or customization time (Levine et al., 1983; McCormick & Jeanneret, 1988).</p>	<p align="center">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>The PAQ is an off-the-shelf approach that can be purchased at a relatively low cost (McCormick & Jeanneret, 1988).</p>
<p align="center">Length of Time to Administer</p> <ul style="list-style-type: none"> <input type="radio"/> Short (e.g., less than 2 hours) <input checked="" type="radio"/> Medium (e.g., 2 hours to 5 hours) <input type="radio"/> Long (e.g., 5 hours or longer) <p>Depending on number of data collection procedures used, PAQ may take 2 to 10 hours to complete a full job analysis for one position (Brannick & Levine, 2002; Brannick et al., 2007; Gatewood et al., 2008; Jones et al., 1991; McCormick & Jeanneret, 1988).</p>	<p align="center">Monetary Cost to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>There is no expensive equipment used and little additional resources beyond incumbent and analyst time is needed.</p>

Exhibit 18-1 (Continued)
Position Analysis Questionnaire: Practice Description and Results

Resources Needed (Continued)

Data Documenting Resource(s)

Work/Job Analysis Instrument	Hard Copy/Structured Note Pages	Computer Software
<p>The job analyst completes the PAQ, which is comprised of 195 items that cover information input (e.g., visual sources of job), mental processes (e.g., decision making, reasoning and planning/scheduling), work output (e.g., level of physical exertion), relationships with other people (e.g., advising), job context (e.g., outside physical working conditions), and other job characteristics (e.g., apparel worn) (Brannick & Levine, 2002; Brannick et al., 2007; Jones et al., 1991; McCormick & Jeanneret, 1988; McPhail et al., 2004).</p>	<p>Hard copy notes are taken while collecting all data (e.g., while reviewing materials or observing job) in order to complete the PAQ questionnaire (Gatewood et al., 2008; Jones et al., 1991; McPhail et al., 2004).</p>	<p>Data may be prepared for processing by making ratings on the PAQ directly on the Internet at www.PAQ.com (McPhail et al., 2004). Additionally, computerized analyses of existing worker qualifications data from the PAQ can be used to identify attributes associated with PAQ items (Gatewood et al., 2008).</p>

Additional Resource(s) Needed

<p align="center">Access to Workspace</p> <p>In order to conduct a job observation, the job analyst must be given access to the workspace in which the job normally occurs (Jones et al., 1991; McPhail et al., 2004; Robinson, 2009).</p>	<p align="center">Meeting Space</p> <p>The job analyst may meet an incumbent at the job site or a previously-designated meeting space to conduct an interview (Gatewood et al., 2008; McPhail et al., 2004; Robinson, 2009).</p>
<p align="center">Computer</p> <p>Though not required, a computer is needed if the job analyst distributes an electronic pre-interview questionnaire via email or enters the PAQ ratings at www.PAQ.com (Gatewood et al., 2008; McPhail et al., 2004).</p>	<p align="center">Web Access</p> <p>Though not required, Web access is needed if the job analyst distributes an electronic pre-interview questionnaire via email or enters the PAQ ratings at www.PAQ.com (McPhail et al., 2004; Robinson, 2009).</p>
<p align="center">Access to Organizational Materials</p> <p>Access to organizational materials, such as job descriptions and training materials, is needed in order to conduct a review of written materials (Carlisle, 1986; Gael, 1990).</p>	

Exhibit 18-1 (Continued)
Position Analysis Questionnaire: Practice Description and Results



Pros/Cons



Positive Aspects of Practice

- ▶ Cost efficient (Brannick & Levine, 2002; Brannick et al., 2007; Gatewood et al., 2008; Jones et al., 1991; Levine et al., 1983; McCormick & Jeanneret, 1988)
- ▶ Takes a shorter time to complete than many other job analysis methodologies (Levine et al., 1983; McCormick & Jeanneret, 1988)
- ▶ Requires few resources (Jones et al., 1991)
- ▶ Applies to a wide spectrum of jobs (Gatewood et al., 2008)
- ▶ Research-supported reliability and validity (Gatewood et al., 2008; McCormick & Jeanneret, 1988)

Negative Aspects of Practice

- ▶ Requires analyst judgment (Brannick & Levine, 2002; Brannick et al., 2007; Jones et al., 1991)
- ▶ Rated lower than other job analysis methods on suitability for content validity (McCormick & Jeanneret, 1988)
- ▶ Requires analyst to have at least college reading level (Gatewood et al., 2008; Levy, 2009)
- ▶ Not well-suited for managerial jobs (Levy, 2009)
- ▶ Some criticize that items are abstract (Levy, 2009)
- ▶ Given that the PAQ focuses on a given content model, and the elements of that content model are examined with a standardized instrument, the following issues need to be considered:
 - The content model might not include some elements important to disability determination
 - The standardized instrument may not provide the details on a particular element that are important to disability determination

Exhibit 18-1 (Continued)
Position Analysis Questionnaire: Practice Description and Results



 Expert Evaluation 	
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <p>▶ This is a well-validated approach; however, it collects a specific set of data that may not capture elements necessary for disability determination.</p> <p>▶ The PAQ is a very well-researched and well-respected job analysis method. It is supported by a long history of practical use and published research.</p>	<ul style="list-style-type: none"> ▶ The PAQ has been researched extensively and is one of the most useful of the standardized job analysis instruments (Sanchez & Levine, 2001). ▶ The PAQ provides job component validity (Jeanneret, 1992). ▶ The PAQ is one of the highest-rated models for purposes of job classification and job evaluation, though is not as good for performance appraisal and worker training purposes (Levine, Ash, Hall, & Sistrunk, 1993).
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ There is strong research support for the validity of the PAQ.</p>	<p>▶ There is strong research support for the reliability of the PAQ.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ The PAQ is a well-respected and widely used job analysis approach.</p>	<p>▶ The PAQ would likely be easy to train; however, it is important to keep in mind that it requires at least a college reading level.</p>

Exhibit 18-1 (Continued)
Position Analysis Questionnaire: Practice Description and Results



Expert Evaluation (Continued)



<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ Steps to increase confidentiality can be implemented, such as requiring analysts to sign a confidentiality document for each organization.</p>	<p>▶ The PAQ requires few resources to implement.</p>
<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ This is an off-the-shelf approach that was designed to be applicable to any job.</p>	<p>▶ Because this is an off-the-shelf approach, it may not collect the level of granularity required for SSA.</p>
<p>Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ This is an off-the-shelf approach that may not collect all of the task and contextual data needed by SSA.</p>	<p>▶ This is an off-the-shelf approach that may not collect all of the KSA data needed by SSA.</p>

Chapter 19: Task Inventory

This chapter provides a summary of the Task Inventory job analysis model. The information presented below is based on research collected through 117 literature review sources and 12 focus groups. Task Inventory involves collecting an inventory of tasks through a variety of data collection procedures, including review of written materials, job observation, interviews, and surveys.

Exhibit 19-1 Task Inventory: Practice Description and Results

The Task Inventory is a widely-used job analysis approach that involves defining a list of tasks or activities carried out on the job (Sanchez & Levine, 2001). To complete a task inventory, an initial task list is often constructed from written materials, such as job descriptions, training materials, or operating manuals (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Christal & Weissmuller, 1988; Gael, 1990). Next the analyst conducts a combination of job observations, interviews, and surveys with a job incumbent and/or his/her direct supervisor. Throughout the job observations, interviews, and surveys, the analyst tries to verify the task list and identify any job information that was overlooked (Christal & Weissmuller, 1988). Additionally, these data collection procedures allow for the analyst to ensure that the language used is technically correct, unambiguous, and accurately reflects work performed by incumbents (Christal & Weissmuller, 1988). Once the final list of tasks have been identified, they are often rated according to their importance, frequency, time spent, difficulty of learning, or essentiality for the job (Brannick & Levine, 2002; Brannick et al., 2007; Christal & Weissmuller, 1988; Gatewood, Field, & Barrick, 2008; Jones, Steffy, & Bray, 1991; Levy, 2009; Sanchez & Levine, 2001). To aid in making disability determinations, each task or work activity can be rated in terms of the criteria of “essential job functions” (Brannick, & Levine, 2002; Sanchez & Levine, 2001).

Job Analysis Practice Highlights

- ▶ Popular in the United States, but time consuming
- ▶ May collect data via Review of Written Materials, Interview, Job Observation, and Survey
- ▶ Collects Task Descriptions
- ▶ Used in Industrial/Organizational Psychology and Human Resources

Task inventory has high face validity and thus is popular among organizations in the United States (Sanchez & Levine, 2001). It also has been rated as having a higher-quality outcome than some other job analysis practices (Levine, Ash, Hall, & Sistrunk, 1983) and has a high acceptability by users of the model (Levine et al., 1983). The Task Inventory job analysis approach, however, is time consuming (Carlisle, 1986; Gatewood et al., 2008; Levine et al., 1983) and can lack standardization across analysts and jobs without significant planning, preparation, and training (Carlisle, 1986).



Discipline(s)					
 Physical and Occupational Therapy <input type="radio"/> Yes <input checked="" type="radio"/> No	Occupational Health <input type="radio"/> Yes <input checked="" type="radio"/> No	Industrial/Organizational Psychology <input checked="" type="radio"/> Yes <input type="radio"/> No	Vocational Rehabilitation <input type="radio"/> Yes <input checked="" type="radio"/> No	Human Resources <input checked="" type="radio"/> Yes <input type="radio"/> No	 Ergonomics <input type="radio"/> Yes <input checked="" type="radio"/> No

Exhibit 19-1 (Continued)
Task Inventory: Practice Description and Results

Exhibit 19-1 (Continued)			
Task Inventory: Practice Description and Results			
✎	Quality & Data Considerations		✎
<p align="center">Level of Detail in Data Collected</p> <p> <input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise </p> <p>The Task Inventory provides a list of major work activities performed (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986). The level of detail in tasks can vary depending of the situation's objective, and it is important to be precise, complete yet brief, and relevant to the activity being defined (Carlisle, 1986). The Task Inventory is used to collect detailed information about the job, but does not include precise measurements in data collection.</p>	<p align="center">Level of Job Performance Measured</p> <p> <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal </p> <p>The Task Inventory captures typical performance (Christal & Weissmuller, 1988) and it is recommended that large representative samples of data sources be used to collect data (Brannick & Levine, 2002; Brannick et al., 2007). A Task Inventory typically asks if a task is part of a job, the importance of the task, or how much time is spent on it. There is no specification that should be based on top performers, but rather ratings are made based on average performance.</p>	<p align="center">Security of Data</p> <p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High </p> <p>Data security can vary based on the procedures in place for a specific task analysis, but will likely be moderate in most situations. If data must be stored in hard copy format or manually entered into a computer or computer program, there will be an average level of security. However, if data can be entered into a secure digital medium and transmitted this way, data security will be high. This high level of security can be achieved and should be the goal.</p>	

Exhibit 19-1 (Continued)
Task Inventory: Practice Description and Results

Quality & Data Considerations (Continued)

Quality & Data Considerations (Continued)		
<p align="center">Validity of Data</p> <p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High </p> <p>Certain Task Inventory data collection procedures (e.g., job observation or interview without a protocol) have significant opportunity for analyst judgment and potential error, though the amount of judgment is lesser for surveys that rate frequency, importance, or criticality due to the use of Likert-type rating scales (Brannick & Levine, 2002; Brannick et al., 2007). It is recommended to collect data from multiple incumbents and supervisors to allow the analyst to cross-check data and identify any inconsistencies across individuals and various data collection procedures (Gatewood et al., 2008).</p>	<p align="center">Reliability of Data/ Standardization of Procedures</p> <p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> Complete </p> <p>The standardization of the Task Inventory approach varies depending on the data collection procedure used. For example, an unstructured interview (Gatewood, et al., 2008) has less reliability and standardization than a paper-based survey (Jones et al., 1991).</p>	<p align="center">Ease of Data Aggregation</p> <p> <input type="radio"/> Difficult <input checked="" type="radio"/> Moderate <input type="radio"/> Easy </p> <p>The ease of data aggregation greatly depends on the data collection procedures used. Certain data collection procedures produce data that can be analyzed via a computer (e.g., survey; Brannick & Levine, 2002; Brannick et al., 2007), while other data require manually coding and combining (e.g., card-sort; Carlisle, 1986).</p>
Data Source(s)		
<p align="center">Incumbents</p> <p>The incumbent is typically the main source for collecting task data through a variety of data collection procedures (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Christal & Weissmuller, 1988; Gael, 1990; Gatewood et al., 2008; Jones et al., 1991).</p>	<p align="center">Direct Supervisors</p> <p>Supervisors may explain what is happening during a job observation (Brannick & Levine, 2002; Brannick et al., 2007) or be used to verify incumbent information (Gatewood et al., 2008). Supervisors are also sometimes used because they may be better able to comment on the necessary employee characteristics required to perform job tasks (Christal & Weissmuller, 1988; Gael, 1990; Gatewood et al., 2008).</p>	

Exhibit 19-1 (Continued) Task Inventory: Practice Description and Results					
Data Source(s) (Continued)					
Organizational Materials			Other Data Source		
Job descriptions, training materials, organizational charts, resumes, management objective lists, equipment descriptions, operations plans, maintenance manuals, work flows, and previous task lists can be used to help identify job tasks (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Christal & Weissmuller, 1988; Gael, 1990).			Any job-knowledgeable employees may be surveyed about the tasks that job incumbents perform to accomplish their work (Gael, 1990).		
Target Data Collection Procedure(s)					
Review of Written Mats.	Job Observation	Survey	Interview	Focus Groups	Assessment of Physical Demands
<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Yes <input checked="" type="radio"/> No
Type of Data Collected					
Task Descriptions		Importance/Frequency of Activities		Environment Conditions/Work Context	
A task inventory is collected, which is a listing of all work activities (i.e., tasks) performed to complete a job (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986; Christal & Weissmuller, 1988; Gael, 1990; Jones et al., 1991; Levy, 2009; Sanchez & Levine, 2001). Task statements should be clear, specific, precise, complete yet brief, and relevant (Carlisle, 1986). They should begin with an action verb and answer the questions what, for whom, why, and how (Gatewood et al., 2008).		The inventory may ask an incumbent simply whether they perform the task as part of their job or may request a judgment of the degree of involvement, time spent, importance, criticality, difficult to learn, the ability of others to cover for the incumbent, or satisfaction with the task (Brannick & Levine, 2002; Brannick et al., 2007; Christal & Weissmuller, 1988; Gatewood et al., 2008; Jones et al., 1991; Levy, 2009; Sanchez & Levine, 2001).		Contextual information about the job (e.g., noise, temperature, lighting) can also be collected (Brannick & Levine, 2002; Brannick et al., 2007; Carlisle, 1986).	

Exhibit 19-1 (Continued)
Task Inventory: Practice Description and Results

Type of Data Collected (Continued)	
<p align="center">Tools, Equipment, and Work Aids</p> <p>Information about people, paper, materials, office supplies, equipment, or systems may also be collected (Carlisle, 1986; Gael, 1990).</p>	<p align="center">Other Data Collected</p> <p>Information on personal items, such as company or job tenure or demographic information may be collected (Gael, 1990).</p>
Resources Needed	
<p align="center">Length of Time to Develop</p> <ul style="list-style-type: none"> <input type="radio"/> Short (e.g., less than 1 month) <input checked="" type="radio"/> Medium (e.g., 1 to 6 months) <input type="radio"/> Long (e.g., 6 months or longer) <p>Although the basic premise of Task Inventory is straightforward (i.e., collect a list of tasks), deciding on the data collection procedures, the types of data, the level of detail in data, the format of task statements, and other specific parameters can be time-consuming.</p>	<p align="center">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>Task Inventory does not have many monetary costs associated with the development of the technique, but may be time-consuming.</p>
<p align="center">Length of Time to Administer</p> <ul style="list-style-type: none"> <input type="radio"/> Short (e.g., less than 2 hours) <input type="radio"/> Medium (e.g., 2 hours to 5 hours) <input checked="" type="radio"/> Long (e.g., 5 hours or longer) <p>Task Inventory usually combines multiple data collection procedures and possibly multiple iterations of a specific data collection procedure (e.g., interview), which can be time-consuming and costly (Carlisle, 1986; Gael, 1990; Jones et al., 1991).</p>	<p align="center">Monetary Cost to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>Task Inventory does not have many monetary costs associated with the various data collection procedures, but may be very time-consuming for the analyst, incumbents, and supervisors participating, costing labor resources.</p>

Exhibit 19-1 (Continued)
Task Inventory: Practice Description and Results



Resources Needed (Continued)



Data Documenting Resource(s)

Hard Copy/Structured Note Pages

The analyst should record detailed notes of the task statements shared by the participant during the data collection procedures (e.g., interview) (Carlisle, 1986; Gael, 1990; Gatewood et al., 2008). A structured interview-recording form (e.g., three columns: 1. inputs that stimulate action, 2. actions performed, 3. outputs or results of actions) can be very helpful to an analyst in writing task statements (Gael, 1990).

Voice Recorder

Though not necessary, the analyst may find it helpful to voice record interviews to ensure all information is captured and accurate (Carlisle, 1986; Gael, 1990; Gatewood et al., 2008).

Video Recorder

Though not necessary, the analyst may find it helpful to video record interviews or job observations to ensure all information is captured and accurate (Gael, 1990).

Computer Software

To help make identification and analysis of tasks easier, the analyst(s) can make a list of the most likely task statements and associate it with a code prior to the data collection. This would allow the analyst to enter the code into a computer to help track and analyze the tasks via a computer (Gael, 1990).

Additional Resource(s) Needed

Meeting Space

Meeting space is needed to interview an incumbent and/or supervisor (Carlisle, 1986; Gael, 1990).

Access to Organizational Materials

Access to organizational materials, such as job descriptions and training materials, is needed in order to conduct a review of written materials (Carlisle, 1986; Gael, 1990).

Access to Workspace

Access to a participant's normal workspace is needed to conduct a job observation of tasks performed (Carlisle, 1986).

Computer

A computer is helpful to help manage and analyze large amounts of task data (Gael, 1990).

Exhibit 19-1 (Continued)
Task Inventory: Practice Description and Results





	Pros/Cons		
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Has high face validity (Sanchez & Levine, 2001) ▶ Is good for the development of selection procedures and establishing content validity of selection measures (Gatewood et al., 2008) ▶ Can be applied to a variety of jobs in both small and large organizations (Gatewood et al., 2008) ▶ Flexible to serve a variety of needs (Christal & Weissmuller, 1988) ▶ Allows for quick collection of detailed task information (Pearlman & Sanchez, 2010) ▶ Easy to collect information from a large sample of workers (Pearlman & Sanchez, 2010) 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Time-consuming to develop (Carlisle, 1986; Gatewood et al., 2008; Levine et al., 1983; Pearlman & Sanchez, 2010) ▶ Expensive (Levine et al., 1983) ▶ Can lack standardization across analysts and jobs without significant planning, preparation, and training (Carlisle, 1986) ▶ Task-oriented output does not provide any information necessary to determine worker-related or knowledge, skills, and ability data (Pearlman & Sanchez, 2010) 		
	Expert Evaluation		
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <ul style="list-style-type: none"> ▶ This is a strong, flexible approach that collects detailed job information. ▶ The Task Inventory is well-respected by job analysis experts and accepted as a job analysis procedure. It has a long history of use and research support. 	<ul style="list-style-type: none"> ▶ Has high face validity and thus is popular among organizations in the United States (Sanchez & Levine, 2001). ▶ Rated highly in acceptability by users of the practice (Levine et al., 1983). ▶ Rated highly by experts for the purposes of job description, job classification, and job design (Levine et al., 1983). ▶ Rated as having a higher-quality outcome than some other job analysis practices (Levine et al., 1983). 		

Exhibit 19-1 (Continued)
Task Inventory: Practice Description and Results





 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Validity of this approach is somewhat questionable due to the amount of analyst judgment involved.</p>	<p>▶ A lot of judgment is left to the analyst in determining the number and specificity of task. Thus, significant training is involved to ensure standardization across analysts.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ This is an approach used only in select disciplines and it may not be perceived as adequate to meet SSA's needs.</p>	<p>▶ While the approach itself is not difficult to train, significant training may be involved to ensure standardization across analysts.</p>
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Steps to increase confidentiality can be implemented, such as requiring analysts to sign a confidentiality document for each organization.</p>	<p>▶ This is a time-intensive model that may not collect the type of data SSA needs.</p>

Exhibit 19-1 (Continued) Task Inventory: Practice Description and Results	
 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely
<p>▶ The Task Inventory is a flexible approach that can be applied to a wide variety of jobs.</p>	<p>▶ Although the level of granularity depends on the job analysis instrument or guidance given to each job analyst, it is likely the Task Inventory could collect highly granular data.</p>
<p>Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely 	<p>Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input checked="" type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ Tasks are the primary focus of the Task Inventory approach.</p>	<p>▶ The traditional Task Inventory method does not collect KSA data, as tasks are the primary focus.</p>

Chapter 20: Threshold Traits Analysis (TTA)

This chapter provides a summary of the Threshold Traits Analysis System (TTA) job analysis model. The information presented below is based on research collected through 117 literature review articles and 12 focus groups. The full TTA method combines multiple data collection procedures, which include review of written material, interviews, and job observations as well as the completion of standard questionnaires by incumbents and supervisors, and the underlying TTA objective across all uses is to assist analysts in linking worker traits to job task performance.

Exhibit 20-1

Threshold Traits Analysis: Practice Description and Results

The Threshold Traits Analysis (TTA) System is a worker-oriented method of job analysis, developed in 1970 by Felix Lopez, and measures job functions, environmental demands, and worker traits (Levine, Ash, Hall, & Sistrunk, 1983). The TTA was developed to identify worker traits relevant to a target job (Brannick & Levine, 2002). According to Lopez (1988), a trait is an observable characteristic that distinguishes one person from another.

This method, originally developed in the discipline of Industrial/ Organizational Psychology, includes TTA questionnaires that measure a standard set of 21 job functions, worker demands, and 33 traits across 5 areas: 1) Physical (e.g., stamina, agility); 2) Mental (e.g., perception, memory, problem solving); 3) Learned (e.g., planning, decision making, communication); 4) Motivational (e.g., dependability, initiative); and 5) Social (e.g., cooperation, tolerance, influence) (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988). The 33 traits are also broadly clustered into two trait groups: “can do” and “will do” traits. The “can do” traits are described as abilities and include physical, mental and learned worker characteristics. The “will do” traits include the attitudinal, motivational, and social characteristics. Areas, traits, and functions are all specifically linked together within the TTA system (Brannick et al., 2007; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).

The range of jobs that can be analyzed by the TTA is expansive including diverse occupations such as bank tellers, call center representatives, nuclear reactor operators, senior administrative assistants, and professional and managerial personnel (Lopez, 1988). The entire system can be used for many purposes. Some pieces are designed for describing traits for selection, some for training, and some are designed for job description (Brannick & Levine, 2002). The full TTA method combines multiple data collection procedures, which include review of written material, interviews, and job observations as well as the completion of standard questionnaires by incumbents and supervisors (Brannick & Levine, 2002; Gatewood & Feild, 2001; Lopez, 1988). The underlying TTA objective across all uses is to assist analysts in linking worker traits to job task performance (Levine et al., 1983; Lopez, 1988).

Job Analysis Practice Highlights

- ▶ Collects worker trait, job demand and job function data
- ▶ Standardized, off-the-shelf job analysis model that provides valid, reliable data.
- ▶ Model has been shown to be legally defensible.
- ▶ Well-regarded in Job Analysis community
- ▶ Used in Industrial/Organizational Psychology and Human Resources.

Exhibit 20-1 (Continued)					
Threshold Traits Analysis: Practice Description and Results					
Discipline(s)					
Physical and Occupational Therapy	Occupational Health	Industrial/Organizational Psychology	Vocational Rehabilitation	Human Resources	Ergonomics
<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input checked="" type="radio"/> No
Quality & Data Considerations					
<p style="text-align: center;">Level of Detail in Data Collected</p> <input type="radio"/> General <input checked="" type="radio"/> Moderate <input type="radio"/> Precise		<p style="text-align: center;">Level of Job Performance Measured</p> <input type="radio"/> Minimal <input checked="" type="radio"/> Average <input type="radio"/> Maximal		<p style="text-align: center;">Security of Data</p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High	
<p>The TTA uses 2 standard questionnaires to collect data: the Threshold Trait Analysis questionnaire and the Demand/Job Function questionnaire. Each gathers data around major position requirements (Brannick et al., 2007; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).</p>		<p>The TTA captures method on average job performance across incumbents (Levine et al., 1983).</p>		<p>Data are collected via hard copy notes during interviews or focus groups as well as through questionnaires and the analyst's review of written materials (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988). Although hard copy notes introduce the possibility of data entry-errors, data should be reasonably secure if analysts are properly trained and procedures are followed correctly.</p>	
<p style="text-align: center;">Validity of Data</p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> High		<p style="text-align: center;">Reliability of Data/Standardization of Procedures</p> <input type="radio"/> Low <input checked="" type="radio"/> Moderate <input type="radio"/> Complete		<p style="text-align: center;">Ease of Data Aggregation</p> <input type="radio"/> Difficult <input type="radio"/> Moderate <input checked="" type="radio"/> Easy	
<p>Validity for the TTA system has been demonstrated (Lopez, 1988). Each item in the TTAS is rated on a specific rating scale, but the data collection processes allow some opportunities for judgment (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).</p>		<p>The same TTA items are rated for every position analyzed, but the exact data collection procedures (e.g., interview questions) may be adapted by the job analyst to the situation (Brannick & Levine, 2002; Gatewood & Feild, 2001; Lopez, 1988).</p>		<p>Since all data collected are ultimately defined through responses to standard questionnaire items, the aggregation process is efficient (Lopez, 1988).</p>	

Exhibit 20-1 (Continued)					
Threshold Traits Analysis: Practice Description and Results					
Data Source(s)					
Incumbents			Organizational Materials		
Job incumbents may complete a pre-interview questionnaire or be the object of an interview and/or job observation (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).			Position descriptions, organizational charts, or training materials may be reviewed by the job analyst (Brannick & Levine, 2002; Gatewood & Feild, 2001).	Supervisors can provide an overview of key functions performed or review the accuracy and reliability of job analysis ratings (Brannick & Levine, 2002; Gatewood & Feild, 2001; Lopez, 1988).	
Target Data Collection Procedure(s)					
Review of Written Mats.	Job Observation	Survey	Interview	Focus Groups	Assessment of Physical Demands
<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No
Type of Data Collected					
Personality Characteristics			Environment Conditions/Work Context		
The TTA measures 33 worker traits. Many of these traits describe and assess personality characteristics related to incumbents' necessary motivational and social traits (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).			TTA gathers data related to work location, individuals interacted with, types of deadlines and environmental demands (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).	Job functions are described in terms of difficulty and complexity. For each of the 33 traits assessed, five characteristics are measured: relevance, significance, level, uniqueness and practicality (Brannick & Levine, 2002; Levine et al., 1983; Lopez, 1988).	
Knowledges, Skills, & Abilities			Physical Demands		
Many of the 33 traits describe and assess ability characteristics related to incumbents' necessary mental and learned traits (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).			The TTA measures physical traits, such as physical exertion and vigilance, through standard questionnaire items. The items are completed by supervisors (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).	The TTA system measure cognitive demands, such as attention and information processing, through its Demand and Task Analysis Questionnaire administered to job incumbents. Ratings scales are used to measure task significance and frequency (Levine et al., 1983; Lopez, 1988).	
Cognitive Demands					



Exhibit 20-1 (Continued) Threshold Traits Analysis: Practice Description and Results	
 Resources Needed 	
<p style="text-align: center;">Length of Time to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Short (e.g., less than 1 month) <input type="radio"/> Medium (e.g., 1 to 6 months) <input type="radio"/> Long (e.g., 6 months or longer) <p>The TTA is an off-the-shelf approach that can be used for any job with little additional development or customization time (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).</p>	<p style="text-align: center;">Monetary Cost to Develop</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>The TTA is an off-the-shelf approach that can be purchased at a relatively low cost (Lopez, 1988; Sanchez & Levine, 2001).</p>
<p style="text-align: center;">Length of Time to Administer</p> <ul style="list-style-type: none"> <input type="radio"/> Short (e.g., less than 2 hours) <input checked="" type="radio"/> Medium (e.g., 2 hours to 5 hours) <input type="radio"/> Long (e.g., 5 hours or longer) <p>Depending on the data collection procedures used, the TTA system may take 2 to 10 hours to complete a full job analysis for one position (Lopez, 1988).</p>	<p style="text-align: center;">Monetary Cost to Administer</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Inexpensive <input type="radio"/> Moderate <input type="radio"/> Expensive <p>There is no expensive equipment used and little additional resources beyond incumbent and analyst time are needed (Lopez, 1988; Sanchez & Levine, 2001).</p>
Data Documenting Resource(s)	
Work/Job Analysis Instrument	
<p>Two types of work/job analysis instruments are used in the TTA system: the TTA Questionnaire and the Demand and Task Analysis Questionnaire. The TTA Questionnaire is administered to supervisors and asks respondents to rate each of the 33 standard traits included in the TTA system along the following: relevance, significance, level, uniqueness and practicality. The Demand and Task Analysis Questionnaire is elicited from job-specific task information assembled by the analyst. This questionnaire is administered to incumbents to learn more about job functions and related work demands. The survey is included in the TTA system (Brannick et al., 2007; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).</p>	
Additional Resource(s) Needed	
<p style="text-align: center;">Access to Workspace</p> <p>In order to conduct a job observation, the job analyst must be given access to the workspace in which the job normally occurs (Brannick et al., 2007; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).</p>	<p style="text-align: center;">Meeting Space</p> <p>The questionnaires are typically administered to supervisors and incumbents in a group setting. Meeting space may also be needed for interviews (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).</p>







Exhibit 20-1 (Continued) Threshold Traits Analysis: Practice Description and Results	
 Resources Needed (Continued) 	
Additional Resource(s) Needed (Continued)	
<p style="text-align: center;">Computer</p> <p>A computer is needed if the job analyst participates in the aggregation of data (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988).</p>	<p style="text-align: center;">Access to Organizational Materials</p> <p>Access to organizational materials, such as job descriptions and training materials, is needed in order to conduct a review of written materials (Carlisle, 1986; Gael, 1990).</p>
 Pros/Cons 	
<p>Positive Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Cost efficient (Lopez, 1988) ▶ Takes a shorter time to complete than many other job analysis methodologies (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988) ▶ Requires few resources (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988) ▶ Applies to a wide spectrum of jobs (Lopez, 1988) ▶ Research-supported reliability and validity (Lopez, 1988) 	<p>Negative Aspects of Practice</p> <ul style="list-style-type: none"> ▶ Requires analyst judgment (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988) ▶ Due to standardization of procedures (Brannick & Levine, 2002; Gatewood & Feild, 2001; Levine et al., 1983; Lopez, 1988), features of this practice may be difficult to adapt for SSA-specific purposes. ▶ Given that TTA relies on a standardized instrument to rate traits, it might not include elements that are important to disability determination.
 Expert Evaluation 	
<p>Likelihood Practice will Be Legally Defensible</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely <p>▶ This is an off-the-shelf approach that only collects data on certain traits, which may not be in line with SSA's needs.</p>	<ul style="list-style-type: none"> ▶ TTA is well supported in the literature. ▶ Expert research affirms that the TTA system is a legally defensible job analysis approach (Levine et al., 1983; Lopez, 1988;) ▶ Previous research has shown the TTA to be one of the highest rated methods for the purpose of personnel requirements and specifications (McCutcheon, 2004).





Exhibit 20-1 (Continued) Threshold Traits Analysis: Practice Description and Results	
 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Valid, Objectively Measurable and Verifiable Job Data</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>	<p>Likelihood Practice will Produce Reliable Data When Scaled for National Data Collection</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input type="radio"/> Somewhat Likely <input checked="" type="radio"/> Very Likely </p>
<p>▶ There is some research support for the validity of the TTA.</p>	<p>▶ The TTA gathers data on a standardized instrument, and its reliability is supported by research.</p>
<p>Likelihood Practice will Be Credible Among Job Analysis Experts</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>	<p>Likelihood Analysts Could be Successfully Trained to Use this Practice</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>
<p>▶ TTA is well supported in the literature, but has seen relatively little use in practice.</p>	<p>▶ The TTA involves a number of data collection procedures but could most likely be trained.</p>
<p>Likelihood Practice will Ensure Confidentiality for Employers who Agree to Permit Access to their Facilities, Data, and Employees</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>	<p>Likelihood Practice will Provide an Adequate Return On Resource Investment when Scaled to Analyze Jobs throughout U.S. Economy</p> <p> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely </p>
<p>▶ Steps to increase confidentiality can be implemented, such as requiring analysts to sign a confidentiality document for each organization.</p>	<p>▶ This is an off-the-shelf approach that would likely be fairly low cost to implement.</p>

Exhibit 20-1 (Continued) Threshold Traits Analysis: Practice Description and Results	
 Expert Evaluation (Continued) 	
<p>Likelihood Practice will Collect Data Related to All Occupations Represented in the Standard Occupational Classification (SOC) System</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Collect Data Granular Enough to Capture Information Specific to an Occupation</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ The TTA applies to a wide spectrum of jobs.</p>	<p>▶ Because the TTA is a standardized approach, it may not collect data at the level of granularity required by SSA.</p>
<p>Likelihood Practice will Describe Occupations in Terms of Core Tasks and Required Work Activities and Contextual Characteristics (Job-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely 	<p>Likelihood Practice will Define the Minimum KSA Levels Necessary to Perform the Core Tasks of a Given Occupation at a Satisfactory Level (Person-Side)</p> <ul style="list-style-type: none"> <input type="radio"/> Very Unlikely <input type="radio"/> Somewhat Unlikely <input checked="" type="radio"/> Somewhat Likely <input type="radio"/> Very Likely
<p>▶ TTA is a person-oriented approach that does not collect task information; however, some of the traits may relate to work activities.</p>	<p>▶ Some KSAs that are of particular interest to SSA may not be included in the standardized questionnaire.</p>

Chapter 21: Supplementary Job Analysis Models

This chapter provides an overview of supplemental job analysis models that were considered as part of this project. While the models included in this supplementary chapter may have content that SSA could consider for use in their taxonomy, each of the models described in this chapter are included here because they did not have sufficient published empirical support and/or were not suited to SSA's OIS needs as a data collection methodology. Exhibit 21-1 presents the 26 job analysis models that are included in this supplementary chapter.

Exhibit 21-1 Additional Job Analysis Models Included in Supplementary Chapter	
▪ Analysis Agreement	14. Occupational Aptitude Patterns Map (OAP Map)
▪ Combination Job Analysis Method (C-JAM)	15. Occupational Reinforcer Patterns
▪ Critical Incident Technique	16. Office of Personnel Management (OPM) Desk Audit Procedure
▪ Developing a Curriculum (DACUM)	17. Potential Hazard Job Analysis
▪ General Work Inventory (GWI)	18. Professional and Managerial Position Questionnaire (PMPQ)
▪ Health Services Mobility Study Approach	19. Strategic Job Analysis
▪ Job Components Inventory (JCI)	20. Task Attribute Performance Analysis
▪ Job Diagnostic Survey (JDS)	21. Task Inventory Analysis
▪ Job Element Inventory (JEI)	22. Time-and-Motion Study
▪ Management Position Description Questionnaire (MPDQ)	23. Western Region Intergovernmental Assessment Council Methodology
▪ Managerial and Professional Job Functions Inventory	24. Work Sampling
▪ Mental Workload Assessment	25. Worker Analysis Profile
▪ Occupation Analysis Inventory (OAI)	26. Workload Analysis

These job analysis models are further described in Exhibit 21-2 in the same order as the above table. For each model, we provide a summary of the practice (first bullet(s)) and then the reason for its inclusion in the supplemental chapter rather than a major summary chapter (last bullet).

Exhibit 21-2 Additional Job Analysis Models	
Model	Description of Model
1. Analysis Agreement	<ul style="list-style-type: none"> ▪ Analysis Agreement involves a face-to-face interview between the job analyst and the client about various aspects of the job analysis, including the goals, methods, and results (Carlisle, 1986). Specific techniques and objectives are discussed and agreed upon. Analysis agreement is not used to collect specific information about jobs but rather to determine what information will be collected during the job analysis and how it will be analyzed (Carlisle, 1986). Analysis Agreement should result in a contract that details the job analysis process as it will be performed and this contract should be used as a guide during the entire job analysis process. The analyst should take thorough notes during an analysis agreement as this information will guide the job analysis process (Carlisle, 1986). Analysis Agreement helps to reduce miscommunications because everything about the job analysis is decided in advance but can be frustrating to managers who want to get a job analysis started quickly (Carlisle, 1986). ▪ When SSA hires individuals to perform job analyses, the types of questions that are asked and decisions made during the analysis agreement will already be resolved. Therefore, Analysis Agreement is likely not necessary for SSA's purposes.
2. Combination Job Analysis Method (C-JAM)	<ul style="list-style-type: none"> ▪ The Combination Job Analysis Method (C-JAM) examines both the work tasks and human attributes necessary for a job (Brannick & Levine, 2002; Brannick, Levine, & Morgeson, 2007). C-JAM includes multiple meetings that occur away from the workplace and include between five and seven incumbents as well as two supervisors who are familiar with the job. During the first meeting, an initial list of job tasks is developed. In the second meeting, the tasks are rated in terms of difficulty and consequence of error. Another meeting is then conducted to generate and rate the knowledge, skills, abilities, and other characteristics (KSAOs) needed to perform the tasks. The KSAOs are rated on necessity at entry, if it is practical to expect in the labor market, extent of trouble if ignored, and the ability to distinguish superior from average workers (Brannick & Levine, 2002; Brannick et al., 2007). The meeting about KSAOs can contain a larger proportion of supervisors than the task meeting because these individuals tend to have a better idea of the types of people who will be successful in the job than do incumbents. For this same reason, trainers for the job can be included in the KSAO meeting (Brannick & Levine, 2002; Brannick et al., 2007). Instead of holding meetings to complete C-JAM, interviews can be conducted, but meetings, whether in person or online, are preferable (Brannick & Levine, 2002; Brannick et al., 2007). ▪ Regarding standardization of this model, the same general procedure is applied at meetings but features could be adapted depending on the situation. However, there is a lack of empirical research regarding C-JAM and sufficient methodological detail is not available for SSA's purposes.

Exhibit 21-2 (Continued)
Additional Job Analysis Models

3. Critical Incidents Technique	<ul style="list-style-type: none"> ▪ The Critical Incident Technique involves supervisors or incumbents recalling actual work behaviors that are examples of exceptionally good or exceptionally poor performance (DuBois, Shalin, Levi, & Borman, 1995; Pearlman & Sanchez, 2010). This model has been used in the fields of Industrial/Organizational Psychology and Human Resources. While the Critical Incident Technique provides information on certain work behaviors, it does not describe all behaviors that must be performed on the job (Brannick & Levine, 2002; Brannick et al., 2007). To develop critical incidents, job incumbents or supervisors provide information regarding work behaviors either in interviews, focus groups, or by completing questionnaires (Bownas & Bernardin, 1988; Brannick & Levine, 2002; Brannick et al., 2007; DuBois et al., 1995). Each critical incident identified should include the context in which a behavior occurs, the behavior itself, and the consequences of the behavior (Brannick & Levine, 2002; Brannick et al., 2007; Bownas & Bernardin, 1988). ▪ The Critical Incident Technique is valuable in that it provides very rich and specific data; however, downsides to this model include that it is very costly and time-consuming to complete and results in organizationally-specific behaviors that are rarely generalizable to other organizations (Bownas & Bernardin, 1988; Brannick & Levine, 2002; Brannick et al., 2007; Pearlman & Sanchez, 2010). Additionally, the Critical Incidents technique is rated poorly in terms of standardization and reliability by experts and is reported to have lower quality outcomes than other job analysis methods (Levine, Ash, Hall, & Sistrunk, 1983). Due to these reasons as well as the fact that the Critical Incident Technique is more about work performance than the job itself and therefore more applicable to performance appraisal than job analysis (Bownas & Bernardin, 1988; Pearlman & Sanchez, 2010), the Critical Incident Technique will likely not be valuable for SSA's purposes.
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Exhibit 21-2 (Continued)
Additional Job Analysis Models

4. Developing a Curriculum (DACUM)	<ul style="list-style-type: none"> ▪ Developing a Curriculum (DACUM) is a model that comes from the field of education. While often used to create courses or training programs, it can also be used to conduct job and occupational analyses (Norton, 1997, 1998). DACUM consists of a 2-day focus group that includes between 5 and 12 expert job incumbents. These incumbents come together to generate a complete list of job information including: <ul style="list-style-type: none"> ▪ Job duties and tasks ▪ General knowledge and skills necessary for the job ▪ Tools, equipment, supplies, and materials ▪ Attitudes and traits required for the job ▪ Future trends and concerns ▪ If a focus group must be modified to be less than 2 days in length, the facilitator of the focus group should review existing job descriptions for the job being analyzed before the focus group meets (Norton, 1997). This ensures that the facilitator is knowledgeable about the job and will be able to achieve complete and accurate results even with a shortened focus group. The DACUM focus group includes top performing incumbents because its focus is on determining what expert performers do, to prepare others to be experts as well (Norton, 1997, 1998). The DACUM handbook lists many advantages to using the DACUM model for job analysis including that it can be used to create ADA compliant job descriptions, it includes significant employee involvement which increases employee buy-in, brainstorming in the focus group ensures all tasks and duties are identified, it is lower cost than other methods that take longer than 2 days, and it includes a future orientation (Norton, 1997). ▪ Although the DACUM handbook lists DACUM as a low cost and quick procedure, there may be other models that can be more efficient and cost effective. Additionally, there is not a great deal of empirical information available on the use of DACUM for job analysis.
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Exhibit 21-2 (Continued) Additional Job Analysis Models	
5. General Work Inventory	<ul style="list-style-type: none"> ▪ The General Work Inventory (GWI) is a structured job analysis questionnaire that was developed as a shortened form of the Occupational Analysis Inventory (OAI) (Cunningham, Wimpee, & Ballentine, 1990). It was designed to be less technical and specific than the OAI, with the intention that any literate incumbent would be able to complete the GWI (Cunningham et al., 1990). The GWI includes 286 items that are both worker- and job-oriented. These items comprise a variety of topics about the job such as: <ul style="list-style-type: none"> ▪ Job activities ▪ Knowledges, skills, and abilities ▪ Physical activities ▪ Mental requirements ▪ Tools, equipment, and machines used ▪ Physical work conditions and interpersonal activities ▪ Job opportunities and benefits ▪ These items are rated on either a part of the job scale, which asks how much a part of the job each activity is, or a scale that asks the extent to which each activity occurs on the job (Cunningham et al., 1990). ▪ While the GWI may provide a taxonomy that is informative in choosing what to measure as a part of job analysis, it does not provide information that is beneficial in the development of a job analysis methodology.
6. Health Services Mobility Study Approach	<ul style="list-style-type: none"> ▪ When conducting a job analysis using the Health Services Mobility Study Approach (HSMS), an inventory is the primary means of data collection (Gilpatrick, 1988). This inventory is created by observing incumbents perform the job, interviewing incumbents, talking to expert panels, and reviewing written materials related to the job. Each of these procedures is used to identify and describe tasks and collect information on required knowledge and skills (Gilpatrick, 1988). Once the tasks, knowledge, and skills have been identified, they are combined into an inventory that incumbents are asked to complete, rating the frequency of tasks as well as the level of knowledge and skills required for each task. ▪ The HSMS can be a time-consuming job analysis model because of the time needed to develop the task descriptions for the inventory, but a positive aspect is that the HSMS is a relatively generic procedure that can be applied in a variety of industries even though it has typically been used in health service occupations (Gilpatrick, 1988).

Exhibit 21-2 (Continued) Additional Job Analysis Models	
7. Job Components Inventory	<ul style="list-style-type: none"> ▪ The Job Components Inventory (JCI) consists of a survey instrument that incumbents can complete as a paper-and-pencil survey or that an interviewer can administer (Banks, 1988). The JCI is an established questionnaire that was developed as a job inventory approach that would be well-suited to British jobs (Banks, Jackson, Stafford, & Warr, 1983). The JCI includes items about a variety of data types. These include: <ul style="list-style-type: none"> ▪ Skills, such as mathematical skills and communication skills ▪ Physical and perceptual skills ▪ Cognitive demands such as decision making and responsibility ▪ Job conditions ▪ Tools and equipment used on the job ▪ Other job characteristics, such as feedback and variety of tasks ▪ The JCI is a standard survey that is administered to all participants, which means that there is complete standardization in the administration of this inventory. There is also evidence for the validity of the JCI (Banks, 1988). Additionally, test-retest reliability has been assessed by asking repeat items and showed highly consistent ratings (Radziewicz, 1998). The JCI has also been shown to be able to discriminate between occupational areas, job titles, and different organizations (Banks et al., 1983). Furthermore, the language in the JCI is appropriate for low skills jobs and it is a comprehensive inventory that is applicable to a wide variety of jobs and it is not too time consuming to administer (Banks, 1988). ▪ While the JCI may be very beneficial as a job analysis instrument, it does not provide methodological information beyond that provided in the questionnaire chapter of this report. Additionally, the JCI was designed to be used for vocational guidance (Brannick et al., 2007) and has not received a significant amount of empirical research regarding its use for job analysis in recent years.
8. Job Diagnostic Survey	<ul style="list-style-type: none"> ▪ The Job Diagnostic Survey (JDS) is an instrument based on Job Characteristics Theory that assesses job characteristics (skill variety, task identity, task significance, autonomy, and feedback), critical psychological states, affective outcomes, context satisfaction, and growth need strength (Kulik & Oldham, 1988). Information collected is used to indicate the “motivating potential” of jobs (Pearlman & Sanchez, 2010). The JDS is completed by job incumbents and has been shown to have satisfactory validity and be very standardized across administrations. The JDS may be more predictive of affective outcomes, such as job satisfaction, than behavioral outcomes, such as job performance (Kulik & Oldham, 1988). ▪ The JDS is not likely to be beneficial for SSAs needs given that it does not collect information on the observable job elements necessary for SSA. It is generally used as a job design aid and does not provide a means for identifying knowledge, skills, and abilities or tasks that are a part of job analysis (Pearlman & Sanchez, 2010).

Exhibit 21-2 (Continued)
Additional Job Analysis Models

9. Job Element Inventory (JEI)	<ul style="list-style-type: none"> ▪ The Job Element Inventory (JEI) is a structured questionnaire that is based on the Position Analysis Questionnaire (PAQ) but that was developed to have a lower reading level, which enables a wider variety of incumbents to complete the questionnaire (Cornelius, Hakel, & Sackett, 1979). The JEI collects worker-oriented information on dimensions similar to those collected using the PAQ (Harvey, Friedman, Hakel, & Cornelius, 1988). Additionally, developers of the JEI adapted the PAQ to make it appropriate for use in military positions (Cornelius et al., 1979), but it has since been adapted for use in civilian jobs (Harvey et al., 1988). The JEI collects a variety of data including: <ul style="list-style-type: none"> ▪ Required job tasks ▪ Cognitive demands such as decision making and information processing ▪ Environmental conditions and work context such as working outdoors or in hazardous conditions and social interactions with others ▪ Physical demands such as lifting, balance, and body positions ▪ Using tools and equipment on the job ▪ Each of the items on the JEI is rated in terms of how much time is spent on that activity during the job (Harvey et al., 1988). A benefit of the JEI is that it has been shown to be useful in conducting job analyses and can be completed by most incumbents. Because it can be completed by incumbents rather than analysts, the JEI can be a very cost-effective job analysis tool (Harvey et al., 1988). ▪ For its job analysis process, SSA seeks to employ a methodology that does not rely on incumbent self-ratings of data (Social Security Administration, 2009). Therefore, analysts or other trained individuals will likely be completing the job analysis and any associated instruments or questionnaires. Because the purpose for creating the JEI was to make a job analysis instrument that could be used when use of the PAQ is inappropriate for the reading level of employees responding and it measures very similar dimensions as the PAQ, which has received much more empirical support than the JEI, the JEI will likely not be useful for SSA's purposes.
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Exhibit 21-2 (Continued) Additional Job Analysis Models	
10. Management Position Description Questionnaire (MPDQ)	<ul style="list-style-type: none"> ▪ The Management Position Description Questionnaire (MPDQ) is a self-report, behavior-based questionnaire that managers use to provide information about their jobs (Brannick & Levine, 2002; Brannick et al., 2007; Tornow & Pinto, 1976). The MPDQ collects information about a variety of aspects of the job, including: <ul style="list-style-type: none"> ▪ General managerial tasks (cognitive, administrative, and interpersonal tasks) ▪ Knowledge, skills, and abilities required by the job ▪ Cognitive demands, such as decision-making and planning ▪ Significance of tasks to the job ▪ The information provided by the MPDQ is quite extensive, with the questionnaire often taking longer than two hours to complete (Brannick & Levine, 2002; Brannick et al., 2007). While the self-report nature of the MPDQ can introduce bias to rating, positive aspects of this job analysis model are the standardization it provides across managerial jobs, its comprehensiveness, and a low cost of administration (Brannick & Levine, 2002; Brannick et al., 2007). ▪ While the MPDQ does have some positive qualities, it is not appropriate for SSA's purposes because it is only suited for analyzing management jobs and is not applicable to lower level jobs. SSA requires a job analysis method that can collect information on jobs of all skill levels (Social Security Administration, 2009).
11. Managerial and Professional Job Functions Inventory	<ul style="list-style-type: none"> ▪ The Managerial and Professional Job Functions Inventory involves administering a questionnaire to job incumbents and/or their direct supervisors (Baehr, 1988). The questionnaire is used to collect data on broad job functions, some of which are cognitive in nature such as judgment and decision-making. These job functions are rated on how important each is for successful overall job performance. The Managerial and Professional Job Functions Inventory is a beneficial job analysis model in that it provides a standardized questionnaire that can be used in a variety of upper level positions (Baehr, 1988). ▪ Like the MPDQ, this job analysis model is not appropriate for SSA's purposes given that it is only used for higher level positions and is not appropriate for analyzing lower level jobs.

Exhibit 21-2 (Continued) Additional Job Analysis Models	
12. Mental Workload Assessment	<ul style="list-style-type: none"> ▪ The goal of Mental Workload Assessment, a job analysis model that originates in the field of Human Factors, is to measure the mental effort, activity, and processing necessary for task demands on the job (Casali & Wierwille, 1988). This can be accomplished using primary task techniques (performance measurement and physiological measures) or subjective opinion techniques (interviews and questionnaires). Performance measurement provides objective data by measuring performance and the time it takes to perform tasks whereas physiological measures involve precise measurement of physiological indices such as heart rate or blood pressure to determine mental load. Questionnaires and interviews, on the other hand, rely on incumbents and collect subjective data, which can be easy to collect, but subject to potential errors and biases (Casali & Wierwille, 1988). ▪ Because this job analysis model is specifically used to identify mental processes in the workplace, it is likely not suited to SSAs needs for an overall job analysis methodology since it is limited in scope.
13. Occupation Analysis Inventory (OAI)	<ul style="list-style-type: none"> ▪ The Occupation Analysis Inventory (OAI) is a structured questionnaire comprising 617 items that was used to develop a taxonomy of work elements (Cunningham, Boese, Neeb, & Pass, 1983). It includes ratings of work activities and conditions and is considered to be a research questionnaire (Cunningham, 1988). The OAI questionnaire can be completed by incumbents (Cunningham, 1988) or by trained analysts (Cunningham et al., 1983). The OAI includes ratings of an array of work elements including: <ul style="list-style-type: none"> ▪ Task descriptions ▪ Knowledges, skills, and abilities ▪ Cognitive demands ▪ Physical demands ▪ Tools, equipment and work aides ▪ Environment conditions/work context ▪ Other work elements such as work goals ▪ Ratings for the OAI include ratings of extent of use, applicability, and significance of the work elements (Cunningham, 1988). Because the OAI is a structured questionnaire, it is very standardized in that each person completing the questionnaire receives the same survey. Additionally, there is evidence for the validity of the OAI (Cunningham, 1988). Another positive aspect of the OAI is that it is a very comprehensive questionnaire, covering a wide range of work elements with more content specificity than other job analysis measures (Cunningham, 1988; Cunningham et al., 1983). However, the extensive nature of this questionnaire also means that it can be very time consuming to complete. Additionally, it has primarily been used as a research tool and for occupational exploration rather than being applied to actual job analyses (Cunningham, 1988; Cunningham et al., 1983).

Exhibit 21-2 (Continued) Additional Job Analysis Models	
14. Occupational Aptitude Patterns Map (OAP Map)	<ul style="list-style-type: none"> ▪ The Occupational Aptitude Patterns Map (OAP Map) was created as an occupational classification system that includes aptitudes predictive of good job performance (Gottfredson, 1986). While the OAP Map specifies aptitudes required for various categories of occupations, it does not provide a method for collecting job related data. For the OAP Map, OAPs (which include the aptitudes predictive of good job performance) that had been previously developed by the U.S. Employment Service were categorized to cluster together jobs that are similar in terms of required aptitudes (Gottfredson, 1986). ▪ The OAP map does not focus on specific jobs but rather on families as work. As such, it will not be beneficial to SSA in the creation of a job analysis method because it is not used to collect data for specific jobs.
15. Occupational Reinforcer Patterns (ORPs)	<ul style="list-style-type: none"> ▪ Occupational Reinforcer Patterns (ORPs) describe the reinforcers that are available in the workplace for individuals. ORPs are developed through the use of a structured questionnaire, the Minnesota Job Description Questionnaire (MJDQ; Borgen, 1988). The MJDQ is given to both incumbents and supervisors and they are asked to provide data about the job, including the following: <ul style="list-style-type: none"> ▪ General work responsibilities ▪ Attitudinal features of the work such as feelings of achievement and moral values ▪ Cognitive aspects of the job including creativity, autonomy, and decision making responsibility ▪ Interpersonal nature of the job ▪ Compensation ▪ Opportunities for advancement ▪ This information can then be combined into occupational taxonomies (Borgen, 1988). Typically, results of the ORPs are compared to individual responses on the Minnesota Importance Questionnaire (MIQ) to match individuals to jobs that would be suitable for their vocational needs (Borgen, 1988). ▪ While features of ORPs could be adapted for job analysis, it has not been widely used in this manner (Borgen, 1988). Additionally, the psychometric procedures used to produce the ORPs are very complex and different from other analysis procedures. For these reasons, ORPs are not likely a good job analysis model for use by SSA.

Exhibit 21-2 (Continued)
Additional Job Analysis Models

<p>16. Office of Personnel Management (OPM) Desk Audit Process</p>	<ul style="list-style-type: none"> ■ The Desk Audit Process is used by the Office of Personnel Management to categorize jobs based on the similarities and differences of each job's duties, responsibilities, and required qualifications (U.S. Department of the Interior, 2007). Typically, the OPM Desk Audit Process is initiated at a supervisor's request or if an incumbent believes that the job tasks have changed and are different from those listed in the position description. This process involves first reviewing any background information about the job being classified. Additionally, it involves interviewing both the job incumbent and the supervisor in order to gain a detailed description of the position being audited, with interviews lasting approximately one hour (U.S. Department of the Interior, 2007). During the interview, incumbents are asked to provide various information about their position, such as: <ul style="list-style-type: none"> ■ A description of the tasks performed on the job ■ The amount of time spent on various tasks ■ Changes that have occurred to the job in the past year ■ Examples of work completed for the job ■ The OPM Desk Audit Process is a combination of two job analysis procedures that have already been detailed previously in this report: Review of Written Materials (Ch. 4) and Interviews (Ch. 7). Because the OPM Desk Audit process does not have a specified taxonomy or list of questions to be asked, it does not provide information to assist SSA in developing a job analysis methodology beyond what has already been described in the Review of Written Materials and Interviews chapters.
<p>17. Potential Hazard Job Analysis</p>	<ul style="list-style-type: none"> ■ Potential Hazard Job Analysis is a method that can be used to identify job hazards (Siegel, 1988). It is typically used in the field of human factors, employing a combination of questionnaires, job observations, and/or interviews with incumbents to collect data. This job analysis model collects multiple types of job analysis data including: <ul style="list-style-type: none"> ■ Task descriptions, such as a task list and data on work sequences ■ Tools and equipment used on the job ■ Physical demands ■ Environmental conditions and work context such as noise, temperature, ventilation, work space controls, and safety design features ■ Improper job performance that could present a hazard to the public ■ Protective devices or communications ■ Frequency of performance of tasks and amount of training required ■ Using the Potential Hazard job Analysis requires that the analyst have a job analysis instrument that includes a list of items that should be considered during the observation or interview (Siegel, 1988). Because this job analysis model is specifically used to identify hazards in the workplace, it is likely not suited to SSAs needs for an overall job analysis methodology.

Exhibit 21-2 (Continued)
Additional Job Analysis Models

<p>18. Professional and Managerial Position Questionnaire (PMPQ)</p>	<ul style="list-style-type: none"> ▪ The Professional and Managerial Position Questionnaire (PMPQ) was designed to be used in higher level positions than previous job analysis instruments, such as the Position Analysis Questionnaire (PAQ) (Mitchell, 1978; Mitchell & McCormick, 1979). This questionnaire was created as a continuation in the same line of research that led to the PAQ (Mitchell & McCormick, 1979). The PMPQ is a questionnaire that is meant to be completed by incumbents in managerial and professional positions. It collects a variety of data including: <ul style="list-style-type: none"> ▪ Job tasks, such as work scheduling, planning, and supervising/directing ▪ Knowledge, skills, and abilities such as knowledge of equipment and procedures and written and oral communications ▪ Cognitive demands such as judgment and decision making ▪ Education and training required for the job ▪ Minimum entry qualifications such as required licensing for the job and necessary professional group memberships ▪ Items about other data such as the number of people supervised, category of employment (e.g., private, government, etc.), and salary ▪ Item ratings for the PMPQ include “how much a part of the job” as well as “complexity.” There are also questions about the impact of inadequate performance of tasks (Mitchell, 1978; Mitchell & McCormick, 1979). ▪ Because the PMPQ may be outdated due to the lack of recent empirical research using this questionnaire as well as the fact that this questionnaire is meant only for the analysis of upper level jobs, the PMPQ is not well-suited to meet the needs of SSA.
<p>19. Strategic Job Analysis</p>	<ul style="list-style-type: none"> ▪ When considering information about what a job will be like in the future, it is possible to use Strategic Job Analysis. Strategic Job Analysis comes from the field of Human Resources and involves using focus groups, scenarios of possible future events, and forecasting to predict future changes in what will be necessary for a job (Singh, 2008). Using scenarios of possible future events involves subject matter experts comparing possible future situations to the current work situation to determine changes that might be necessary for employee knowledge, skills, and abilities. Forecasting involves using historical data and advanced statistics to predict future changes in the job. Strategic Job Analysis typically collects information regarding topics such as anticipated technical or organizational changes as well as knowledge, skills, and abilities necessary to effectively perform in the future job. ▪ Strategic Job Analysis will not be beneficial for SSA’s purposes because it is not used to provide information about the current job requirements or activities. SSA requires a job analysis methodology that can collect current, up-to-date information about jobs.

Exhibit 21-2 (Continued)
Additional Job Analysis Models

20. Task Attribute Performance Analysis	<ul style="list-style-type: none"> ▪ Task Attribute Performance Analysis involves collecting job-related data using a variety of data collection procedures (Fogli, 1988). The primary component of this model is an inventory, or written questionnaire. For incumbents, the questionnaire typically includes items about tasks and employee attributes, whereas the questionnaire given to supervisors includes items about employee attributes and performance (Fogli, 1988). Data can also be collected by directly observing incumbents performing the job or by interviewing incumbents and supervisors either individually or in groups. These observations and interviews are used to identify, describe, and clarify task characteristics (Fogli, 1988). Incumbents can also be asked to complete work logs to list and track the activities completed during their workday to provide data for Task Attribute Performance Analysis. Finally, job analysts can review existing organizational materials, such as training materials or Industrial Engineering study data to help with the understanding and clarification of tasks. With Task Attribute Performance Analysis, all of these data collection procedures can be combined to collect a variety of data types, including: <ul style="list-style-type: none"> ▪ Job task characteristics ▪ Knowledge, skills, and abilities ▪ Aptitudes, interests, and motivations ▪ Environmental conditions in the workplace ▪ Required education and experience ▪ Machinery used on the job ▪ Behavioral data, such as what must be done, what is required, and what is good/poor performance ▪ These data are rated in terms of task identification, difficulty, importance, frequency, trainability, and time value (Fogli, 1988). A positive aspect of Task Attribute Performance Analysis is that it is able to collect a wide variety of data relevant to the job by combining several commonly used job analysis procedures into one integrated approach (Fogli, 1988). ▪ There is not a great deal of research available regarding the Task Attribute Performance Analysis model for job analysis. As such, it is included in this supplemental chapter and likely not appropriate for SSA's needs.
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Exhibit 21-2 (Continued)
Additional Job Analysis Models

<p>21. Task Inventory Analysis</p>	<ul style="list-style-type: none"> ▪ Task Inventory Analysis is a job analysis model that includes gathering information via interviews of incumbents, their direct supervisors, or other experts as well as incumbent completion of a paper-and-pencil questionnaire (Drauden, 1988). When using Task Inventory Analysis, interviews occur first, with the purpose of these interviews being to develop items about various aspects of the job. These items comprise the following topics: <ul style="list-style-type: none"> ▪ All work tasks ▪ Necessary knowledge, skills, and abilities ▪ Required personality characteristics ▪ Tools and equipment used on the job ▪ Following the interviews, a list of items related to these topics is generated and used to create the questionnaire that incumbents will complete (Drauden, 1988). Because the items in the questionnaire are developed based on the interviews, the questionnaire is specific to the job that is being analyzed. When completing the questionnaire, incumbents rate the task statements on importance, difficulty, and whether each is essential while knowledge, skill, and ability items are rated on their importance or usefulness (Drauden, 1988). ▪ Task Inventory Analysis is included in this supplemental chapter rather than as a major chapter because there is not a sufficient amount of research on it to warrant a major chapter. Additionally, because of this lack of information, Task Inventory Analysis will likely not be an appropriate practice for SSA's needs.
<p>22. Time-and-Motion Study</p>	<ul style="list-style-type: none"> ▪ Time-and-motion studies originated in the field of Industrial Engineering and focus on the improvement of workers' effectiveness or efficiency (Brannick & Levine, 2002; Brannick et al., 2007). Time studies focus on the amount of time needed to complete tasks whereas motion studies concentrate on the sequence of steps needed to complete tasks. Typically, time-and-motion studies collect data about work tasks, but information about the work environment and tools or equipment used on the job can also be collected. These data are usually collected using job observation or by using photographs or a video recording of the job if observing the job is person is not possible (Brannick & Levine, 2002; Brannick et al., 2007; Mundel, 1988; Niebel, 1988). ▪ While some critics have suggested that time-and-motion studies place too great of an emphasis on efficiency, others believe that can be useful for setting work standards (Brannick & Levine, 2002; Brannick et al., 2007).

Exhibit 21-2 (Continued)
Additional Job Analysis Models

<p>23. Western Region Intergovernmental Personnel Assessment Council Methodology (WRIPAC)</p>	<ul style="list-style-type: none"> ▪ The Western Region Intergovernmental Personnel Assessment Council (WRIPAC) methodology involves reviewing background materials about a job and then conducting interviews and focus groups to perform a job analysis (Ohio Department of Administrative Services, 2006). The WRIPAC methodology is used to collect a variety of data including: <ul style="list-style-type: none"> ▪ Tasks that occur during a typical work day ▪ Personal characteristics a person must possess for the job ▪ Tools, materials, and equipment used on the job ▪ Knowledge, skills, and abilities required to adequately perform ▪ Certifications or licenses required by law to work in the position ▪ Other information, such as how much control employees have over the job ▪ During the interviews and focus groups, Likert-type scales are used to rate tasks on both criticality of the task and time spent performing the task. For the knowledge, skills, abilities and other characteristics (KSAOs), subject matter experts are asked to rate the criticality of each and whether or not it is required upon entry to the position (Ohio Department of Administrative Services, 2006). While interview participants will typically be job incumbents, for highly technical jobs it may be necessary to interview consultants or industry experts who are knowledgeable about the position. When using the WRIPAC, there are is not a predetermined list of items that must be completed but participants are given examples of how task and KSAO statements should be created (Ohio Department of Administrative Services, 2006). Because each focus group or interview creates its own task statements and lists of KSAOs, the information identified could differ across focus groups or interviews.
<p>24. Work Sampling</p>	<ul style="list-style-type: none"> ▪ One job analysis method that has been used in Industrial Engineering is work sampling (Pape, 1988). Work sampling involves breaking down the job into categories of activity, observing an incumbent perform the job at different points in time, and using this information to estimate the proportion of time spent on each activity (Pape, 1988). It is not a job analysis model that is well suited to well-defined and repetitive jobs. ▪ Work sampling is a relatively low cost job analysis model for collecting task and frequency information, but it can be very time consuming to produce accurate results. Some additional positive aspects of work sampling are that it can be used a wide range of jobs, it is less costly than models that require continuous observation, and it produces less distortion than the typical, continuous job observations because the analyst observes the job over a longer period of time (Pape, 1988).

Exhibit 21-2 (Continued)
Additional Job Analysis Models

<p>25. Worker Analysis Profile (WAP)</p>	<ul style="list-style-type: none"> ▪ The Worker Analysis Profile (WAP) was the first job analysis instrument to focus on worker-oriented activities (McCormick, Cunningham, & Gordan, 1967). This is beneficial because it allows for the comparison of human behaviors and job context across different jobs of any type. The WAP includes questions about multiple dimensions of job activities including: <ul style="list-style-type: none"> ▪ Job tasks such as supervisory activities ▪ Cognitive demands such as mental activities ▪ Physical demands such as body and limb activities ▪ Job context such as the physical environment and psychological and social aspects of the job ▪ General characteristics of the job ▪ Each of the 162 items included on the WAP is rated as either yes/no or on a Likert-type rating scale that describes various levels of the item and includes benchmarks made of tasks that are familiar to most people (McCormick et al., 1967). Since its creation, the WAP has not received a great deal of empirical research. In the past 30 years, there do not appear to be empirical articles examining the WAP, which makes the research on this instrument quite outdated. ▪ The creator of the WAP created a much more prominent and highly researched job analysis model, the PAQ, after the WAP was introduced. Because the PAQ and the WAP include similar types of items and the WAP has not received the same abundance of research focus, it is not likely to be beneficial to SSA's job analysis methodology development.
<p>26. Workload Analysis</p>	<ul style="list-style-type: none"> ▪ When using workload analysis, which is a job analysis model from the field of Industrial Engineering, data are obtained by reviewing written materials such as production records, logs, charts, or other similar documents (Busby & Hutsell, 1988). This is not a very standardized procedure because the data available will vary depending on the job and the organization being analyzed. Workload analysis involves determining the job tasks or elements and the frequency of these job elements, their variations, and their durations (Busby & Hutsell, 1988). ▪ Workload analysis can be an effective job analysis procedure because much can be learned from organizational materials, especially when considering patterns in job workloads. However, there are also cautions to consider when using workload analysis. It is necessary to check the accuracy of the records or logs that are used in the workload analysis. Additionally, historical information can be influenced by events that are not recorded, such as an improperly calibrated instrument or an atypical day (Busby & Hutsell, 1988).

SECTION 4: Job Analysis Practice Review Results & Recommendations

Section 4 provides summary results and recommendations of the current effort and includes the following chapter:

Chapter 22: Job Analysis Practice Expert Evaluation, Comparison, & Recommendations

The chapter provides comparative information on each of the job analysis data collection procedures and established models, the results of the expert evaluation, and general recommendations to SSA in choosing an appropriate job analysis methodology.

Chapter 22: Job Analysis Practice Expert Evaluation, Comparison, & Recommendations

To develop its OIS, SSA needs a detailed methodology and strategy that would permit analysts to perform job analysis on jobs that exist throughout the labor market of the United States. The purpose of Call 0001 was to perform the research needed to develop and support this methodology. The Call 0001 approach included consultation with job analysis experts in related fields through focus groups, a detailed review of relevant literature (e.g., reports, white papers, technical and scientific journals), and the development of a specific framework and criteria for evaluating various job analysis approaches and identifying those most suitable for addressing SSA's OIS objectives.

Specifically, this report provides a review and evaluation of the spectrum of job and work analysis practices available across related fields. Historically, job analysis is performed in a number of disciplines by individuals with various background and expertise including vocational rehabilitation counselors, physical and occupational therapists, human resource professionals, ergonomists, occupational health nurses, occupational health physicians, safety professionals, industrial psychologists, disability managers, job placement specialists, neuropsychologists, exercise physiologists, athletic trainers, case managers, risk managers, return-to-work specialists, and claims, or insurance, adjustors. Each type of professional approaches job analysis in a somewhat different manner—for example, physical and occupational therapists tend to focus on the physical, psychomotor, and environmental demands of work. In contrast, human resource professionals tend to approach job analysis with more emphasis on the cognitive and affective requirements for work, while safety professionals focus on the environmental aspects.

Throughout this report, we have provided detailed information on six job analysis data collection procedures, as well as ten established job analysis models. To facilitate the aggregation and comparison of this information, this final chapter presents summary exhibits for both the major data collection procedures and major job analysis models reviewed. These exhibits are intended to provide a quick overview of the job analysis practices on each of the major topics presented in the results chapters, allowing for easy identification of the strengths and limitations across the different approaches. In this chapter, we also present a summary of recommendations identified for SSA's development of a job analysis methodology based upon all of the data gathered throughout the execution of Call Order 0001.

22.1 Results of Analysis Comparison

The ultimate goal of this effort was to summarize the wealth of job analytic procedure information available across disciplines in a manner that will allow SSA decision makers to quickly understand and evaluate various job analysis practices. In this section, we provide a detailed comparison of the six job analysis data collection procedures, as well as the ten job analysis models reviewed. Although recommendations for SSA were subsequently developed from this information, our goal in presenting the analysis results comparison is merely to report on the data that have been obtained throughout this study. Specific recommendations related to the procedures and models are provided later in this chapter.

Comparison of Procedures. Exhibit 22-1 presents a summary of the job analysis data collection procedures that were described in depth in Chapters 4 through 9 of this report. The exhibit compares each practice on the primary topics covered in the chapters, including the disciplines in which the practice is used, quality and data considerations, sources from which the job analysis data are collected, the data collection procedures involved, the type of data collected, and the resources needed to develop and implement the practice. This exhibit is intended to present an overview of the findings collected from the literature review and input from job analysis experts; it is not meant to provide implications in regard to which job analysis practices may be most appropriate for SSA's purposes.

Exhibit 22-1 Data Collection Procedures Comparison Table						
Job Analysis Factors	Ch. 4	Ch. 5	Ch. 6	Ch. 7	Ch. 8	Ch. 9
	Review of Written Materials	Job Observation	Structured Interviews	Focus Groups	Survey	Instrument Measurement of Physical Demands
Discipline(s)						
Physical and Occupational Therapy	✓	✓	✓	✓	✓	✓
Occupational Health	✓	✓	✓	✓		✓
Industrial/Organizational Psychology	✓	✓	✓	✓	✓	
Vocational Rehabilitation	✓	✓	✓	✓	✓	✓
Human Resources	✓	✓	✓	✓	✓	
Ergonomics	✓	✓	✓	✓		✓
Other Disciplines					Human Factors; Voc Counseling	
Quality & Data Considerations						
Level of Detail in Data Collected	General	Moderate	Moderate	Moderate	Moderate	Precise
Level of Job Performance Measured	Average	Average	Average	Average	Average	Average
Security of Data	Moderate	Low	Moderate	Moderate	Moderate	Moderate
Validity of Data	Low	Moderate	Moderate	Moderate	Moderate	High
Reliability of Data/Standardization of Procedures	Low	Moderate	Moderate	Moderate	Complete	Complete
Ease of Data Aggregation	Difficult	Difficult	Difficult	Difficult	Easy	Easy
Data Source(s)						
Incumbents		✓	✓	✓	✓	✓
Direct Supervisors		✓	✓	✓	✓	
Executive Leadership		✓				
Human Resource Professionals		✓	✓	✓	✓	
Organizational Materials	✓					
Other Data Sources	Internet; Local, State, & Fed Reg; Training Programs				Job-Knowledgeable Employees	

Exhibit 22-1 (Continued)						
Data Collection Procedures Comparison Table						
<i>Job Analysis Factors</i>	<i>Ch. 4</i>	<i>Ch. 5</i>	<i>Ch. 6</i>	<i>Ch. 7</i>	<i>Ch. 8</i>	<i>Ch. 9</i>
	<i>Review of Written Materials</i>	<i>Job Observation</i>	<i>Structured Interviews</i>	<i>Focus Groups</i>	<i>Survey</i>	<i>Instrument Measurement of Physical Demands</i>
Target Data Collection Procedure(s)						
Review of Written Mats.	✓					
Job Observation		✓				✓
Survey					✓	
Interview			✓			
Focus Groups				✓		
Assessment of Physical Demands	✓	✓	✓	✓	✓	✓
Other Data Collection Procedures						
Type of Data Collected						
Task Descriptions	✓	✓	✓	✓	✓	
Knowledges, Skills, & Abilities	✓	✓	✓	✓	✓	
Personality Characteristics		✓		✓	✓	
Worker Functions		✓		✓	✓	
Physical Demands	✓	✓	✓	✓	✓	✓
Cognitive Demands		✓	✓	✓	✓	
Tools, Equipment, & Work Aides	✓	✓	✓	✓	✓	
Environmental Conditions/Work Context	✓	✓	✓	✓	✓	
Training & Educational Requirements	✓	✓	✓	✓	✓	
Minimum Entry Qualifications		✓		✓	✓	
Importance/Frequency of Activities		✓		✓	✓	
Other Types of Data Collected	✓	✓	✓	✓	✓	

Exhibit 22-1 (Continued)						
Data Collection Procedures Comparison Table						
Job Analysis Factors	Ch. 4	Ch. 5	Ch. 6	Ch. 7	Ch. 8	Ch. 9
	Review of Written Materials	Job Observation	Structured Interviews	Focus Groups	Survey	Instrument Measurement of Physical Demands
Resources Needed						
Length of Time to Develop*	Short	Medium	Short	Short	Short	Long
Monetary Cost to Develop	Inexpensive	Inexpensive	Inexpensive	Inexpensive	Inexpensive	Expensive
Length of Time to Administer**	Medium	Long	Short	Short	Short	Long
Monetary Cost to Administer	Inexpensive	Inexpensive	Moderate	Inexpensive	Inexpensive	Expensive
Data Document Resource(s)						
Hard Copy/Structured Note Pages	✓	✓	✓	✓	✓	✓
Structured Protocol			✓	✓		
Computer Software					✓	
Work/Job Analysis Instrument		✓			✓	
Camera		✓				✓
Voice Recorder		✓		✓		
Video Recorder		✓				✓
Stopwatch		✓				✓
Scale		✓				✓
Tape Measure		✓				✓
Other Data Documenting Tools						✓
Additional Resource(s) Needed						
Meeting Space	✓		✓	✓	✓	
Access to Workspace		✓	✓			✓
Computer		✓		✓	✓	✓
Web Access					✓	
Telephone Access				✓		
Other Resources				Overhead Projector/ Easel		

*For "Length of Time to Develop", Short = less than 1 month, Medium = 1 to 6 months, Long = 6 months or longer.

**For "Length of Time to Administer", Short = less than 2 hours, Medium = 2 hours to 5 hours, Long = 5 hours or longer.

Comparison of Models. Exhibit 22-2 presents a summary of the job analysis models described in Chapters 11 through 20 of this report. The exhibit compares each model on the disciplines in which the practice is used, quality and data considerations, sources from which the job analysis data are collected, the data collection procedures involved, the type of data collected, and the resources needed to develop and implement the practice.

Exhibit 22-2 Job Analysis Models Comparison Table										
	Ch. 11	Ch. 12	Ch. 13	Ch. 14	Ch. 15	Ch. 16	Ch. 17	Ch. 18	Ch. 19	Ch. 20
Job Analysis Factors	AET	Common-Metric Questionnaire (CMQ)	Cognitive Task Analysis (CTA)	Fleishman Ability Requirement Scales (FJAS)	Functional Job Analysis (FJA)	Job Element Model (JEM)	Occupational Information Network (O*NET)	Position Analysis Questionnaire (PAQ)	Task Inventory (TI)	Threshold Traits Analysis (TTA)
Discipline(s)										
Physical and Occupational Therapy		✓	✓	✓	✓		✓			
Occupational Health										
Industrial/Organizational Psychology		✓	✓	✓	✓	✓	✓	✓	✓	✓
Vocational Rehabilitation			✓	✓	✓		✓	✓		
Human Resources		✓	✓	✓	✓	✓		✓	✓	✓
Ergonomics	✓				✓					
Other Disciplines										
Quality & Data Considerations										
Level of Detail in Data Collected	Moderate	Moderate	Precise	Moderate	Moderate	Moderate	General	Moderate	Moderate	Moderate
Level of Job Performance Measured	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average
Security of Data	Moderate	High	Moderate	Moderate	Moderate	Moderate	Low	Moderate	Moderate	Moderate
Validity of Data	Moderate	High	Moderate	High	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Reliability of Data/Standardization of Procedures	Moderate	High	Moderate	Moderate	Moderate	Low	Complete	Moderate	Moderate	Moderate
Ease of Data Aggregation	Moderate	Easy	Difficult	Easy	Moderate	Difficult	Easy	Easy	Moderate	Easy

Exhibit 22-2 (Continued)										
Job Analysis Models Comparison Table										
	Ch. 11	Ch. 12	Ch. 13	Ch. 14	Ch. 15	Ch. 16	Ch. 17	Ch. 18	Ch. 19	Ch. 20
Job Analysis Factors	AET	Common-Metric Questionnaire (CMQ)	Cognitive Task Analysis (CTA)	Fleishman Ability Requirement Scales (FJAS)	Functional Job Analysis (FJA)	Job Element Model (JEM)	Occupational Information Network (O*NET)	Position Analysis Questionnaire (PAQ)	Task Inventory (TI)	Threshold Traits Analysis (TTA)
Data Source(s)										
Incumbents	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Direct Supervisors	✓	✓		✓	✓	✓	✓	✓	✓	✓
Executive Leadership										
Human Resource Professionals					✓		✓			
Organizational Materials			✓	✓	✓			✓	✓	✓
Other Data Sources				Other SMEs	External Materials; Other SMEs		DOL analysts; I/O Psychology students		Job-Knowledgeable Employees	
Target Data Collection Procedure(s)										
Review of Written Mats.			✓	✓	✓		✓	✓	✓	✓
Job Observation	✓		✓		✓			✓	✓	✓
Survey		✓	✓	✓		✓	✓	✓	✓	✓
Interview	✓		✓	✓	✓	✓	✓	✓	✓	✓
Focus Groups				✓	✓	✓		✓		
Assessment of Physical Demands	✓	✓		✓	✓	✓	✓	✓		✓
Other Data Collection Procedures			Verbal Reports; Auto Capture Systems; Psych Scaling							

Exhibit 22-2 (Continued)										
Job Analysis Models Comparison Table										
	Ch. 11	Ch. 12	Ch. 13	Ch. 14	Ch. 15	Ch. 16	Ch. 17	Ch. 18	Ch. 19	Ch. 20
Job Analysis Factors	AET	Common-Metric Questionnaire (CMQ)	Cognitive Task Analysis (CTA)	Fleishman Ability Requirement Scales (FJAS)	Functional Job Analysis (FJA)	Job Element Model (JEM)	Occupational Information Network (O*NET)	Position Analysis Questionnaire (PAQ)	Task Inventory (TI)	Threshold Traits Analysis (TTA)
Type of Data Collected										
Task Descriptions	✓		✓	✓	✓	✓	✓	✓	✓	
Knowledges, Skills, & Abilities			✓	✓	✓	✓	✓			✓
Personality Characteristics					✓	✓	✓			✓
Worker Functions		✓			✓					
Physical Demands	✓	✓		✓	✓	✓	✓	✓		✓
Cognitive Demands	✓	✓	✓	✓	✓		✓	✓		✓
Tools, Equipment, & Work Aides	✓	✓			✓			✓	✓	
Environmental Conditions/Work Context	✓	✓			✓		✓	✓	✓	✓
Training & Educational Requirements					✓		✓	✓		
Minimum Entry Qualifications							✓			
Importance/Frequency of Activities	✓	✓		✓	✓	✓	✓	✓	✓	✓
Other Types of Data Collected	✓				✓	✓	✓	✓	✓	

Exhibit 22-2 (Continued)										
Job Analysis Models Comparison Table										
	Ch. 11	Ch. 12	Ch. 13	Ch. 14	Ch. 15	Ch. 16	Ch. 17	Ch. 18	Ch. 19	Ch. 20
Job Analysis Factors	AET	Common-Metric Questionnaire (CMQ)	Cognitive Task Analysis (CTA)	Fleishman Ability Requirement Scales (FJAS)	Functional Job Analysis (FJA)	Job Element Model (JEM)	Occupational Information Network (O*NET)	Position Analysis Questionnaire (PAQ)	Task Inventory (TI)	Threshold Traits Analysis (TTA)
Resources Needed										
Length of Time to Develop*	Short	Short	Long	Short	Short	Medium	Medium	Short	Medium	Short
Monetary Cost to Develop	Inexpensive	Inexpensive	Moderate	Inexpensive	Inexpensive	Inexpensive	Inexpensive	Inexpensive	Inexpensive	Inexpensive
Length of Time to Administer**	Medium	Short	Long	Short	Medium	Long	Short	Medium	Long	Medium
Monetary Cost to Administer	Inexpensive	Inexpensive	Inexpensive	Inexpensive	Inexpensive	Inexpensive	Inexpensive	Inexpensive	Inexpensive	Inexpensive
Data Document Resource(s)										
Hard Copy/Structured Note Pages	✓		✓	✓	✓	✓		✓	✓	
Structured Protocol										
Computer Software			✓	✓				✓	✓	
Work/Job Analysis Instrument	✓	✓	✓		✓	✓	✓	✓		✓
Camera										
Voice Recorder			✓	✓		✓			✓	
Video Recorder			✓		✓				✓	
Stopwatch										
Scale					✓					
Tape Measure					✓					
Other Data Documenting Tools										

Exhibit 22-2 (Continued)										
Job Analysis Models Comparison Table										
	Ch. 11	Ch. 12	Ch. 13	Ch. 14	Ch. 15	Ch. 16	Ch. 17	Ch. 18	Ch. 19	Ch. 20
Job Analysis Factors	AET	Common-Metric Questionnaire (CMQ)	Cognitive Task Analysis (CTA)	Fleishman Ability Requirement Scales (FJAS)	Functional Job Analysis (FJA)	Job Element Model (JEM)	Occupational Information Network (O*NET)	Position Analysis Questionnaire (PAQ)	Task Inventory (TI)	Threshold Traits Analysis (TTA)
Additional Resource(s) Needed										
Meeting Space	✓		✓	✓	✓	✓		✓	✓	✓
Access to Workspace	✓		✓		✓			✓	✓	✓
Computer	✓	✓	✓				✓	✓	✓	✓
Web Access								✓		
Telephone Access							✓			
Other Resources									Access to Org Materials	

*For “Length of Time to Develop”, Short = less than 1 month, Medium = 1 to 6 months, Long = 6 months or longer.

**For “Length of Time to Administer“, Short = less than 2 hours, Medium = 2 hours to 5 hours, Long = 5 hours or longer.

22.2 Introduction to Study Recommendations

Recommendations are provided in this section that SSA should consider when developing the final job analysis methodology. Specific recommendations are presented related to:

- Major Job Analysis Procedures Reviewed
- Major Job Analysis Models Reviewed
- Overarching Study Recommendation and Potential Next Steps

All recommendations are based on our focus group and literature review data collection results, analysis of the job analysis practices described in this report, input from our expert panel, and our understanding of SSA's project objectives.

Once important aspects related to the job analysis methodology, such as the content of the job analysis instrument, have been finalized, recommendations specific to SSA's purposes can be made based on all of the information provided in this Final Report. However, given the detailed research gathered, input from job analysis experts, and our understanding of SSA's project objectives, we provide some general recommendations here about the greater job analysis methodology as well as some more specific recommendations of practices that should be considered once the content model and taxonomy are developed. Project findings suggest that SSA's final methodology must systematically combine an appropriate set of individual job analysis practices, potentially including: a subset of data collection procedures, an adaptation of features from an existing job analysis model(s), and/or new data collection procedures specifically designed for the purposes of addressing the requirements of the final content model and populating the OIS. Thus when developing the final methodology, SSA should consider the detailed information and recommendations provided in conjunction with other job analysis practice information gathered in OIS project activities (e.g., content of job analysis instrument, education and experience of job analysts, etc.) to identify the best set of practices to employ.

Recommendations Related to Major Procedures Reviewed. In Exhibits 22-3 through 22-8, we provide our recommendations related to each of the six major data collection procedures reviewed in this report. For each procedure, we provided an overview including *Potential Usage for SSA and Potential Challenges, Example Sources of Data, Example Types of Data Collected, and Example Models that Incorporate the Procedure*. This detail is provided to assist SSA in understanding the procedures reviewed and to provide insights to SSA in developing its final methodology. Extensive detail and findings related to the procedures and models referenced can be found in the results chapters of this report.

**Exhibit 22-3
Review of Written Materials**

Review of Written Materials (RWM) RWM is the process of analyzing job-related documents and reports to gain a broader and more detailed understanding of the job. When conducting RWM, it is prudent for job analysts to take structured notes related to the tasks, knowledges, skills, abilities, cognitive requirements, and physical demands associated with the job as well as other occupational requirements. It is also critical to catalogue all materials reviewed for future reference. Through this process, analysts are able to become more familiar with the target job. Knowledge gained through RWM can even be used to inform subsequent data collection techniques; to refine the questions asked in interviews, focus groups, and surveys; and/or to begin the process of completing structured work analysis instruments.

Potential Usage for SSA:

RWM could serve as an effective, cost-efficient starting point for collecting data about a job and be used to identify the types of additional questions that should be asked in subsequent data collection activities. SSA should incorporate this procedure into the final method chosen.

Potential Challenges:

RWM should only be used in conjunction with other data collection procedures since RWM is dependent on the availability of source documents, which can vary in usefulness.

Data Collection

Example Sources of Data	Example Types of Data Collected	Example Models that Use Procedure
<ul style="list-style-type: none"> ▶ Organizational Materials (e.g., minimum requirements; previous job analysis results, job descriptions, training materials, organizational charts, performance reviews) ▶ Internet (e.g., O*NET, WebCrawler searches for previous job analysis reports and position descriptions in other organizations) ▶ Local, State and Federal Regulations (e.g., legislated guidelines describe the procedures and standards that must be upheld for job tasks to be completed successfully) ▶ Training Programs and Certification Exams (e.g., written materials associated with these prerequisites are often informative) 	<ul style="list-style-type: none"> ▶ Task Descriptions ▶ Tools, Equipment, & Work Aides ▶ Environmental Conditions/Work Context ▶ Physical Demands ▶ Cognitive Demands ▶ Knowledges, Skills, & Abilities ▶ Personality Characteristics ▶ Training & Educational Requirements ▶ Worker Functions ▶ Minimum Entry Qualifications ▶ Other (e.g., Work schedules, peak performance levels, travel, compensation) 	<ul style="list-style-type: none"> ▶ Cognitive Task Analysis (CTA) ▶ Fleishman Ability Requirement Scales (FJAS) ▶ Functional Job Analysis (FJA) ▶ Occupational Information Network (O*NET) ▶ Position Analysis Questionnaire (PAQ) ▶ Task Inventory (TI) ▶ Threshold Traits Analysis (TTA) ▶ Developing a Curriculum (DACUM) ▶ Health Services Mobility Study Approach ▶ Task Attribute Performance Analysis ▶ Workload Analysis

**Exhibit 22-4
Job Observation**

Observations can be used to collect accurate information about job tasks and equipment/ materials used on the job as well as the work environment in which a job occurs. While observing a job, the analyst should interact with the incumbent or ask questions to clarify what the incumbent is doing. However, if interactions will distract the incumbent or create a dangerous situation, the analyst should not interact with the incumbent. In either case, observations should be thoroughly documented in order to maintain a record of what was done and to defend in case of legal challenges

Job observation typically results in highly-detailed and customized information that is specific to the job being examined, which helps to provide a full picture of the job in question. In addition, job observations may not be appropriate for all jobs, such as those that are primarily cognitive in nature or that involve many infrequently performed tasks. Thus, it is recommended that job observations are used as in combination with other data collection procedures. Further, depending on the final instrument, job observations are likely not necessary for the analysis of every job.

Potential Usage for SSA:

Job observations should be incorporated in SSA's final method. They provide detailed information about the job because they do not rely solely on the testimony of incumbents.

Potential Challenges:

Job observations are often times costly and time consuming to conduct. They require the analyst be well trained in the types of information that he/she should be looking for. They are less valuable for highly cognitive jobs in which a number of the work activities are not directly observable.

Exhibit 22-4 (Continued) Job Observation		
Data Collection		
Example Sources of Data	Example Types of Data Collected	Example Models that Use Procedure
<ul style="list-style-type: none"> ▶ Incumbents (especially useful when the job includes physical activities or unusual equipment or working conditions) ▶ Direct Supervisors (may explain what is occurring while the incumbent performs) ▶ Other Officials or Professionals (e.g., executive leadership, safety and health professionals, ergonomists, industrial hygienists, or other established officials can also provide information during job observations) 	<ul style="list-style-type: none"> ▶ Task Descriptions ▶ Tools, Equipment, & Work Aides ▶ Environmental Conditions/Work Context ▶ Physical Demands ▶ Cognitive Demands ▶ Knowledges, Skills, & Abilities ▶ Personality Characteristics ▶ Training & Educational Requirements ▶ Worker Functions ▶ Minimum Entry Qualifications ▶ Importance/Frequency Ratings ▶ Other (e.g., Work schedule, standards, time requirements, hazards, and outputs) 	<ul style="list-style-type: none"> ▶ AET ▶ Cognitive Task Analysis (CTA) ▶ Functional Job Analysis (FJA) ▶ Position Analysis Questionnaire (PAQ) ▶ Task Inventory (TI) ▶ Threshold Traits Analysis (TTA) ▶ Potential Hazard Job Analysis ▶ Task Attribute Performance Analysis ▶ Time-and-Motion Study

**Exhibit 22-5
Survey**

Surveys are often used to estimate how prevalent a practice or belief is across a population of individuals. When used in job analysis, surveys can help identify whether a practice identified by an incumbent is common to the job (as supported by a representative group of incumbents) or is unique to the individual who provided the information. Surveys provide quantitative evidence for the frequency or importance of specific tasks or the linkages of knowledges, skills and abilities to those tasks.

If SSA incorporates a survey in the job analysis methodology, other data collection procedures (e.g., job observation or interview) should be used to supplement or validate the data collected. Finally, alternate methods to collect the information requested in the survey should be devised in the event incumbents are unable to complete the survey due to time constraints or reading levels.

Potential Usage for SSA:

Surveys can be an effective and efficient means of collecting a large amount of data from a large number of job experts (who may be geographically dispersed) across a wide spectrum of jobs. Additionally, the uniformity and standardization of a survey allows for similar interpretations and comparisons of job data obtained from a variety of jobs and locations. Given the utility of surveys, this data collection procedure should be further considered for inclusion in SSA's ultimate methodology.

Potential Challenges:

Two disadvantages of surveys in the SSA context: there are various threats to the validity of the information, and data collection costs could be high. Threats to validity include: incumbents ratings tend to be inflated, incumbents do not have the benefit of understanding their job requirements relative to those of other jobs, incumbents may not fully understand the elements to be rated, and, in this context, respondents will have no particular reason to put effort into completing the survey. Data collection costs will also be high in this context given that SSA will not be able to rely on employer support or universal access to the Internet to complete the survey on-line.

Exhibit 22-5 (Continued) Survey		
Data Collection		
Example Sources of Data	Example Types of Data Collected	Example Models that Use Procedure
<ul style="list-style-type: none"> ▶ Incumbents (most common survey data source) ▶ Direct Supervisors (sometimes more familiar than incumbents with the kinds of people who would be or are successful in the jobs) ▶ HR Professionals (non-incumbent, Subject matter experts can be used to make job analysis survey ratings) 	<ul style="list-style-type: none"> ▶ Task Descriptions ▶ Tools, Equipment, & Work Aides ▶ Environmental Conditions/Work Context ▶ Physical Demands ▶ Cognitive Demands ▶ Knowledges, Skills, & Abilities ▶ Personality Characteristics ▶ Training & Educational Requirements ▶ Worker Functions ▶ Minimum Entry Qualifications ▶ Importance/Frequency Ratings ▶ Other (e.g., Educational level, demographics variables, required travel) 	<ul style="list-style-type: none"> ▶ Common-Metric Questionnaire (CMQ) ▶ Cognitive Task Analysis (CTA) ▶ Fleishman Ability Requirement Scales (FIAS) ▶ Job Element Model (JEM) ▶ Occupational Information Network (O*NET) ▶ Position Analysis Questionnaire (PAQ) ▶ Task Inventory (TI) ▶ Threshold Traits Analysis (TTA) ▶ Job Diagnostic Survey (JDS) ▶ Job Components Inventory ▶ Occupation Analysis Inventory (OAI)

Exhibit 22-6 Structured Interview

Structured interviews allow analysts to collect detailed job information through the direct questioning of incumbents. Both telephonic and face-to-face interviews produce valuable job data; however, conducting the structured interview in person may have an added benefit for the analyst. Face-to-face interviews sometimes permit the analyst to tour the workplace, letting the analyst visually notice job information that may not have surfaced during a phone or desk interview. A face-to-face interview can often be combined with a job observation to collect thorough and valid data.

There are several techniques that should be incorporated to ensure reliable and valid job data are collected through the interview process. First, the interview should include a structured protocol as well as structured note pages to collect and organize participant input. Next, after the interview is complete, the analyst should immediately spend time organizing his/her notes to clarify key job information. In addition, it is often helpful for the analyst to record the interview with the participant's consent. The recording can be referenced to clarify notes taken in the live interview and serve as documentation. Finally, the analyst should conduct multiple interviews. Interviewing different incumbents and supervisors allows the analyst to cross-check data and identify any inconsistencies among interview responses, which can then be clarified.

Potential Usage for SSA:

Structured interviews allow analysts to collect detailed job information and ask clarification questions especially to clarify complex tasks or functions that comprise the job. By being structured, the data from this type of interview can easily be compared to data collected through other interviews. This procedure should be incorporated into SSA's ultimate data collection methodology.

Potential Challenges:

Interviews can be very time-consuming and costly to conduct, especially if travel is required. A large portion of the time involved in interviewing is the development of the structured protocol and coordinating schedules with the interview participant.

Exhibit 22-6 (Continued) Structured Interview		
Data Collection		
Example Sources of Data	Example Types of Data Collected	Example Models that Use Procedure
<ul style="list-style-type: none"> ▶ Incumbents (intimate knowledge of expected performance, daily activities, working conditions, and required KSAs) ▶ Direct Supervisors (provide valuable information about business processes and performance measures) ▶ HR Professionals (have organization-level knowledge of jobs, job activities, and objectives) 	<ul style="list-style-type: none"> ▶ Task Descriptions ▶ Knowledges, Skills, & Abilities ▶ Tools, Equipment, & Work Aides ▶ Environmental Conditions/Work Context ▶ Worker Functions ▶ Importance/Frequency Ratings ▶ Training & Educational Requirements ▶ Personality Characteristics ▶ Physical Demands ▶ Cognitive Demands ▶ Other (e.g., work schedules, peak performance levels, travel, compensation) 	<ul style="list-style-type: none"> ▶ AET ▶ Cognitive Task Analysis (CTA) ▶ Fleishman Ability Requirement Scales (FJAS) ▶ Functional Job Analysis (FJA) ▶ Job Element Model (JEM) ▶ Position Analysis Questionnaire (PAQ) ▶ Analysis Agreement ▶ Combination Job Analysis Method (C-JAM) ▶ Critical Incidents Technique ▶ Health Services Mobility Study Approach ▶ Job Components Inventory

**Exhibit 22-7
Focus Group**

Similar to interviews, a focus group allows job analysts to collect a variety of data, from simple to highly-complex in detail, by asking several job experts questions about the job and what type of individual it might take to perform the work tasks and functions. Focus groups differ from interviews in that focus groups are best used for eliciting information that is most likely to emerge through the interaction of participants.

If focus groups are implemented, there are several guidelines that should be followed. First, specialized training should be provided to job analysts since focus groups required a skilled facilitator. With multiple participants present, the group can easily get off topic if not facilitated properly and confidently. Likewise, the participants should be provided with an agenda prior to the meeting and the analyst should offer participants a concise background of the project, inform them of the goals of the meeting, and guarantee them anonymity upon request. These procedures help establish a strong rapport with participants and create a level of trust, which is necessary for collecting honest and accurate data.

Potential Usage for SSA:

Focus groups can be time- and cost-efficient because they can be used to gather data from multiple sources/incumbents concurrently. When richer data is needed such as when initial work activities and/or task lists are being described, focus groups help incumbents generate ideas through the interaction with others in their cohort. We recommend that interviews be used instead of focus groups whenever possible because focus groups are best reserved for initial stages of data collection if time permits idea generation/brain storming whereas interviews typically allow for more extensive questioning and crystallization of information collected.

Potential Challenges:

It is difficult to ask specific questions or gather precise information when multiple participants are present. It is often challenging to gather detailed information from every individual in a focus group. Group dynamics can skew participant responses. Focus groups can be dominated by more vocal participants, not necessarily more knowledgeable participants. It is easier to get off track in focus group discussions as opposed to other data collection techniques. Focus groups can be difficult to convene since they require coordinating the schedules of multiple individuals.

Exhibit 22-7 (Continued) Focus Group		
Data Collection		
Example Sources of Data	Example Types of Data Collected	Example Models that Use Procedure
<ul style="list-style-type: none"> ▶ Incumbents (valuable resource for focus group data since they are experienced in performing the various elements.) ▶ Direct Supervisors (often placed in separate focus group to provide measures) ▶ HR Professionals (have organization-level knowledge of jobs, job activities, and objectives) 	<ul style="list-style-type: none"> ▶ Task Descriptions ▶ Knowledges, Skills, & Abilities ▶ Tools, Equipment, & Work Aides ▶ Environmental Conditions/Work Context ▶ Worker Functions ▶ Importance/Frequency Ratings ▶ Training & Educational Requirements ▶ Minimum Entry Qualifications ▶ Personality Characteristics ▶ Physical Demands ▶ Cognitive Demands ▶ Other (e.g., Work schedules, peak performance levels, travel, compensation) 	<ul style="list-style-type: none"> ▶ AET ▶ Cognitive Task Analysis (CTA) ▶ Fleishman Ability Requirement Scales (FJAS) ▶ Functional Job Analysis (FJA) ▶ Job Element Model (JEM) ▶ Position Analysis Questionnaire (PAQ) ▶ Analysis Agreement ▶ Combination Job Analysis Method (C-JAM) ▶ Critical Incidents Technique ▶ Strategic Job Analysis ▶ Job Components Inventory ▶ Developing a Curriculum (DACUM)

Exhibit 22-8 Instrument Measurement of Physical Demands

These measures refer to job analysis data collection procedures that involve taking measurements from job incumbents in an effort to assess the physical demands of the job. While physical demands are often inferred through other data collection procedures (e.g., observing or interviewing incumbents and then making ratings), these procedure are defined by the use of measuring devices to take more objective, quantitative measurements. For example, this may involve measuring the amount of force workers must exert, the amount of weight they must lift, the dimensions of their posture, the range of motion they must use, the amount of vibration to which they are subjected, or the amount of repetition required by their work. Photo or video cameras may even be used to capture the motion for subsequent measurement.

Potential Usage for SSA:

The instrument measurement of physical demands results in a number of advantages, including the precise nature of the collected data, high reliability, high validity, and data that are typically easy to aggregate. Depending on SSA's ultimate construct model and data collection instrument, we recommend the inclusion of instrument measurement of physical demands. Given the types of decisions made via SSA's OIS (i.e., disability determinations), it may be imperative to collect physical demands data for jobs that include tasks that are not highly cognitive in nature. In those cases, specific physical demands measures should be used to some extent.

Potential Challenges:

Such detailed measurement procedures can be time consuming and resource intensive, can be intrusive to incumbents, and often involves the use of complex measuring devices that require technical training. Thus, if instrument measurement of physical demands is incorporated into the final methodology, we recommend that its use is limited.

Exhibit 22-8 (Continued) Instrument Measurement of Physical Demands		
Data Collection		
Example Sources of Data	Example Types of Data Collected	Example Models that Use Procedure
<ul style="list-style-type: none"> ▶ Incumbents (measurements of physical demands are taken directly from incumbents). 	<ul style="list-style-type: none"> ▶ Flexion/extension of the limbs or measurement of static postures ▶ Force exerted by incumbents ▶ Weight of objects held, as well as push and pull forces that are exerted ▶ Lift and reach distances or carrying distances ▶ Length of time a physical action is sustained ▶ Internal muscle forces ▶ Ambient temperature ▶ Kinematics ▶ Limb rotation ▶ Energy expenditure 	<ul style="list-style-type: none"> ▶ Goniometer ▶ Pressure Gauge ▶ Scale ▶ Tape Measure ▶ Stopwatch ▶ Electromyography Equipment ▶ Thermometer ▶ Torsiometer ▶ Motion Capture System ▶ Dynamometer ▶ Open Circuit Calorimeter

Recommendations Related to Major Models Reviewed. In Exhibits 22-9 through 22-18 we provide our recommendations related to each of the ten major job analysis models reviewed in this report. For each model, we provided an overview of its *Recommended Applicability to SSA, Tools used to Collect Data, Target Procedures, Example Types of Data Collected, and Example Scaling*. This detail is provided to assist SSA in understanding the models reviewed and to provide insights to SSA in developing its final methodology. Additional information and findings related to the procedures and models referenced can be found in the results chapters of this report.

**Exhibit 22-9
AET: Summary**

AET Recommend Applicability to SSA

The AET involves conducting an observation and interview to complete an ergonomic questionnaire. Although the AET collects a large number of specific data points that are not necessarily in line with the needs of SSA, the combined observation and interview technique coupled with a completion of a standardized tool provides an example of a resource efficient way to collect detailed data about the work context and physical demands of the job. The AET is effective at measuring the physical and psychological stresses of work tasks, as well as environmental conditions and work context. If SSA were to adopt a strategy involving observation and interview followed by analyst ratings, there are several aspects of the AET that SSA might want to incorporate into the OIS.

Effective features that SSA might want to consider:

- The use of structured observation and interviews together with completion of a standardized tool by the analyst
- The use of descriptors that isolate specific types of physical effort (e.g., finger, hand, and forearm muscular effort without support of body weight).
- The use of descriptors that measure work context
- The use of scales that focus on frequency, duration, and significance
- The use of examples to assist in coding level of demand

Limitations for the SSA context:

- The AET was developed in Germany, in the context of the German culture and language. Although the AET has been translated into English, the instrument has not been used widely in America. The reason may be that some of the concepts have not translated well into the English language or have oblique relevance in American culture.
- The examples used to aid in coding would need to be edited to ensure that they are resistant to changes in the way work is done in different cultures and over time.
- Regardless of cultural differences, use of the model may be difficult for people who are not trained in ergonomics.

AET Data Collection

Tools	Target Procedure(s)	Example Types of Data Collected	Examples of Scaling
<ul style="list-style-type: none"> ▶ 216-item AET job analysis questionnaire includes items on 3 major elements: 1) the person-at-work system (i.e., work objects, equipment, and work environment); 2) tasks; and 3) demands (i.e., perception, decision, action) ▶ Hard copy notes are taken while conducting the job observation and interview in order to complete the AET questionnaire at a later time 	<ul style="list-style-type: none"> ▶ Job observation ▶ Structured interview 	<ul style="list-style-type: none"> ▶ Physical demands (e.g., body posture, frequency of movements, vision) ▶ Cognitive demands (e.g., time pressure, information processing, decision making) ▶ Environmental conditions/work context (e.g., physical work environment, hazards and risks, social environment) ▶ Tools, equipment, and work aides 	<ul style="list-style-type: none"> ▶ Importance/significance of tasks ▶ Duration of tasks ▶ Frequency of job characteristics ▶ Phases of stress are quantified according to duration, height, sequence, and temporal distribution within the work shift

Exhibit 22-10
Common-Metric Questionnaire: Summary
CMQ Recommend Applicability to SSA

The CMQ collects data via a survey administered directly to incumbents and/or their immediate supervisors. The CMQ uses an innovative matrix structure that allows for collection of a large amount of data in a relatively short period of time. The CMQ focuses on observable work behaviors, so the ratings tend to be reliable. These work behaviors are also generalizable across jobs, so it is possible to compare jobs on a large number these work behaviors and behaviorally-based scales. If SSA were to adopt a strategy involving surveying incumbents/supervisors, the CMQ would have a lot to offer.

Effective features that SSA might want to consider:

- The matrix structure of the questionnaire.
- The computerized interface to allow for effective use of the questionnaire.
- The use of behavioral and observable descriptors that are easy for incumbents and supervisors to rate.
- The use of descriptors that measure work context, and a wide variety of descriptors involving working with data, people, and things
- The use of scales that allow for comparison across jobs.

Limitations for the SSA context:

- While the Generalized Work Behaviors that characterize much of the CMQ are good for describing jobs, examiners may wish to search for jobs by matching the broad abilities and skills of the claimant, and the CMQ does not include a comprehensive set of descriptors at this broad level.
- Some incumbents/supervisors might not have the access to a computer to use the computerized interface like that of the CMQ.
- CMQ-like items on the OIS would need to be continually updated as the meaning and relevance of job activity statements changes over time.
- As with any incumbent/supervisor survey, SSA will need to identify and apply methods to encourage a high response rate among incumbents and supervisors.

Exhibit 22-10 (Continued)
Common-Metric Questionnaire: Summary

CMQ Data Collection

Tools	Target Procedure(s)	Example Types of Data Collected	Example Scaling
<ul style="list-style-type: none"> ▶ Standardized, matrix-structured questionnaire, based upon FJA, that allows incumbents to describe their own jobs, by increasing the verifiability and accuracy of ratings, and by producing ratings that allow managerial and non-managerial jobs to be rated on a common metric ▶ Collects more than 2,000 data points for each job ▶ Computer software is typically used to administer the survey 	<ul style="list-style-type: none"> ▶ Survey ▶ Assessment of physical demands 	<ul style="list-style-type: none"> ▶ Worker functions (e.g., worker's interaction with data, people, and things). ▶ Cognitive demands (e.g., information processing, decision making regarding the management of financial and human resources, long-term planning) ▶ Physical demands (e.g., running, walking, lifting, pushing) ▶ Environmental conditions/work context (e.g., weather conditions, noise, time pressure, control over work) ▶ Tools, equipment, and work aides (e.g., machines and tools that must be used on the job) 	<ul style="list-style-type: none"> ▶ Ratings are collected on a range of topics, including interpersonal activities, decision-making activities, mechanical and physical activities, and the work context ▶ Frequency of activities is measured using a concrete rating scale that describes specific time intervals (e.g., activity is performed every few hours to daily) ▶ Criticality and consequences of activities are also measured ▶ Ratings describing the incumbents role in the activity are also collected

**Exhibit 22-11
Cognitive Task Analysis: Summary**

CTA Recommend Applicability to SSA

The CTA approach involves using a variety of data collection procedures to ultimately identify the cognitive processes underlying a job with a particular focus on the processes that distinguish an expert from a novice. CTA can be a resource-intensive approach and is not well suited for collecting the type of data needed by SSA; thus, CTA is not recommended as a basis for SSA’s methodology.

Effective features that SSA might want to consider:

- The use of structured observation and interviews together with completion of a structured tool by the analyst
- Identification of the various types of knowledge needed to do the job.

Limitations for the SSA context:

- CTA procedures tend to lack the detailed information needed by SSA on various physical abilities.
- Using the CTA approach would require extensive training of analysts.
- This is a labor intensive approach would be costly and unnecessary given the type of data needed by SSA.

CTA Data Collection

Tools	Target Procedure(s)	Example Types of Data Collected	Example Scaling
<ul style="list-style-type: none"> ▶ 98-item Purdue CTA questionnaire measuring 8 cognitive dimensions, grouped into 3 types of data: 1) Cognitive demands; 2) Knowledge, skills and abilities; 3) Task descriptions ▶ Hard copy notes are taken while reviewing written materials, conducting the job observation and interview in order to complete the CTA questionnaire at a later time ▶ Specific computer software dependent on the automated capture method applied. 	<ul style="list-style-type: none"> ▶ Review written materials ▶ Surveys ▶ Job observation ▶ Structured interview ▶ Verbal reports (e.g., work logs and daily journals) ▶ Automated capture system 	<ul style="list-style-type: none"> ▶ Cognitive demands (e.g., audio attention, cognitive information processing, analyzing information, mental planning and scheduling) ▶ Knowledges (e.g., declarative, procedural, generative, and self knowledge), skills (e.g., automated, representational, and decision-making skills) and abilities (e.g., ability to pay attention, remember steps or processes, and make decisions). ▶ Task descriptions (e.g., duties associated with performing the job) 	<ul style="list-style-type: none"> ▶ Data related to the factors that distinguish the performance of an expert and novice, including the individual’s goals, mental models, cognitive resources, and cognitive strategies ▶ Incumbents may be asked to sort or rank order concepts ▶ The scaling for CTA is often flexible (e.g., incumbents are asked to keep a record of their thought processes but they do not have specific questions to answer or scales to complete) ▶ The Purdue CTA questionnaire includes items that ask about the frequency, importance, duration of time spent, extent of use, and how much respondents agree with various statements

Exhibit 22-12 Fleishman Ability Requirement Scales: Summary

Fleishman Recommend Applicability to SSA

The primary data collection procedure for the F-JAS model involves the administration of the Ability Requirements Scales to collect data on 52 types of abilities. The procedure also involves conducting interview and observations in order to document job specific tasks, knowledges, and skills. The F-JAS or a variation of this model could be considered by SSA as a method for rating data on abilities; however, it would have to be a subset of a larger methodology that collects a broader range of data. The items and scales would also need to be revised to provide the information that disability examiners need. Note: The Ability Requirements Scales are included in O*NET with only a few modifications.

Effective features that SSA might want to consider:

- The method of conducting interviews and observations to gather job specific information provides data for understanding the job.
- The use of an instrument that focuses on generalizable “person” requirements (i.e., skills and abilities) provides data for cross-job comparison on the aspects of the job that are most directly affected by disabilities.
- In general, the Ability Requirements Scales are well supported by research, although many of the scales might not be relevant for SSA and there are important constructs that are not covered by the scales.
- The use of level scales anchored with observable behaviors.

Limitations for the SSA context:

- If SSA were to administer the Ability Requirements Scales to incumbents, the reliability of the results would likely be low relative to instruments like the CMQ because the constructs are not observable.
- The F-JAS lacks some generalizable physical abilities constructs that are important to SSA.
- The F-JAS scales tend to provide details on the variation of jobs at the high end of many abilities (e.g., the difference between an athlete and an astronaut), whereas SSA might be more interested in getting information about the variation in the jobs at the low end of abilities (e.g., the difference between a parking lot attendant and a cashier).
- As with any incumbent/supervisor survey, SSA would need to identify and apply methods to encourage a high response rate among incumbents and supervisors. Note, however, that we would not recommend that SSA use the F-JAS in this manner.

Exhibit 22-12 (Continued)
Fleishman Ability Requirement Scales: Summary

Fleishman Data Collection

Tools	Target Procedure(s)	Example Type of Data Collected	Example Scaling
<ul style="list-style-type: none"> ▶ Survey evaluating 52 abilities categorized into four categories: 1) Cognitive; 2) Psychomotor; 3) Physical; 4) Sensory/Perceptual ▶ Organization materials (e.g., job descriptions and training materials) to review ▶ Hard copy notes are taken while reviewing the written materials and conducting the interview or focus groups, and are helpful during the task list development phase ▶ Voice recorder in order to accurately capture the data collected during the interview and focus groups, which is helpful to reference in developing the task list 	<ul style="list-style-type: none"> ▶ Review of written materials ▶ Survey ▶ Structured interview ▶ Focus groups ▶ Assessment of physical demands 	<ul style="list-style-type: none"> ▶ Knowledges, skills, and abilities (e.g., oral comprehension, written expression, information ordering, and time sharing) ▶ Physical demands (e.g., arm-hand steadiness, manual dexterity) ▶ Cognitive demands (e.g., memorization, mathematical reasoning) ▶ Task descriptions (e.g., what the worker does, who the work is done for, how the work is done, and why the work is done) 	<ul style="list-style-type: none"> ▶ Ability level required for satisfactory performance is rated on behaviorally-anchored scales ▶ Scales can be administered at either the job (i.e., experts make one set of ratings based on the overall job description) or the task level (i.e., experts make separate sets of ability ratings for each of the job tasks) ▶ When administered at the task level, ratings such as task importance, frequency, and consequences of inadequate performance are collected

Exhibit 22-13
Functional Job Analysis: Summary
FJA Recommend Applicability to SSA

The FJA approach gathers a variety of different types of job analysis data typically collected via interview and observation but may also include other data collection procedures. Because this is the model used for the development of the DOT, it is a comprehensive, standardized, and efficient approach. While the FJA does not meet all of SSA's needs in its current form, features of this approach could likely be adapted to collect all of the data in SSA's content model. The basic approach involving observation and interview followed by analyst ratings appears to fit well with SSA's needs.

Effective features that SSA might want to consider:

- The method of conducting interviews and observations to gather job specific information provides data for understanding the job.
- The use of an instrument that focuses on generalizable "person" requirements including physical abilities provides data for cross-job comparison on the aspects of the job that are most directly affected by disabilities.
- Inclusion of work context and worker environment variables.
- In general, FJA is well supported by research.
- The use of procedures that can be trained easily.
- The procedure builds validity through the use of multiple methods, a structured framework, and structured protocols.

Limitations for the SSA context:

- FJA as implemented by the Revised Handbook for Analyzing Jobs (RHAI) lacks standardization on important issues such as how jobs are sampled, how interviews are conducted, how many interviews are conducted, and how many job analysts are involved.
- The DOT scales lack detail on cognitive abilities and interpersonal skills.
- The scales are appropriate for use by analysts trained in the FJA model only.

Exhibit 22-13 (Continued)
Functional Job Analysis: Summary

FJA Data Collection

Tools	Target Procedure(s)	Example Types of Data Collected	Example Scaling
<ul style="list-style-type: none"> ▶ Job Analysis Report (JAR) is a form that structures the job analysis and assists in recording the data as it includes areas to document all the necessary descriptions and ratings with the aim of identifying two types of information: 1) description of the work performed; and 2) description of the qualifications needed to be successful on the job ▶ Organizational materials (e.g., job descriptions and training materials) ▶ Hard copy notes are taken while conducting the job observation and interview/focus groups ▶ Video recorder may be used during job observations in order to refer back to and ensure accurate data collection ▶ Tape measure and scales may also be used during the job observation in order to gather measurements of standing and seating postures and determine the amount of weight handled by incumbents. 	<ul style="list-style-type: none"> ▶ Review of written materials ▶ Job observation ▶ Structured interview ▶ Focus groups ▶ Assessment of physical demands 	<ul style="list-style-type: none"> ▶ Task descriptions (e.g., specific actions of the worker, distinct work activities) ▶ Worker functions (i.e., how the worker interacts with data, people, and things); in relation to data (e.g., synthesizing, coordinating), people (e.g., mentoring, negotiating), and things (e.g., setting up, precision working) ▶ Cognitive demands (e.g., reasoning, math, and language development) ▶ Physical demands (e.g., strength of the work, climbing, balancing, hearing, far acuity) ▶ Environmental conditions/work context (e.g., exposure to weather, extreme heat, vibrations, noise intensity) ▶ Personality characteristics (e.g., temperaments, interest areas) ▶ Tools, equipment, and work aids (e.g., machines, software programs) ▶ Training and educational requirements (e.g., specific vocational preparation) ▶ Knowledges, skills, and abilities (e.g., aptitudes required in the job) 	<ul style="list-style-type: none"> ▶ Importance/significance and criticality of tasks ▶ Duration of tasks (i.e., amount of time spent doing each task) ▶ Frequency of tasks

**Exhibit 22-14
Job Element Model: Summary**

JEM Recommend Applicability to SSA

JEM focuses on the human attributes required for superior performance on the job and collects data via focus groups, interviews, and surveys. Due to concerns with the reliability of this approach as well as its focus on superior performance, this model is not appropriate as a basis for SSA’s methodology.

Effective features that SSA might want to consider:

- The method of conducting interviews and observations to gather job specific information provides data for understanding the job.

Limitations for the SSA context:

- Experts have previously rated this model low in terms of reliability and standardization, so in order to be legally defensible, these claims would need to be refuted.
- Although JEM is a low cost approach, it involves a significant amount of time to administer.
- JEM’s focus is on high performance on the job, rather than SSA’s need of obtaining data on minimally-necessary abilities; however, it is possible that this could be adjusted.
- The model does not use a standard set of generalizable descriptors, so it is difficult to compare jobs.

JEM Data Collection

Tools	Target Procedure(s)	Example Types of Data Collected	Example Scaling
<ul style="list-style-type: none"> ▶ Job Element Bank is used to rate elements and sub-elements of the job for significance based on the following behavioral factors: 1) job behaviors (e.g., interaction with others), 2) intellectual behaviors (e.g., critical thinking/ reasoning), 3) motor behaviors (e.g., sitting, standing, or walking), and 4) work habits (e.g., multi-tasking). ▶ Hard copy notes are taken to document the data obtained through focus group discussions or from specific responses provided during interviews with SMEs 	<ul style="list-style-type: none"> ▶ Survey ▶ Structured interview ▶ Focus groups ▶ Assessment of physical demands 	<ul style="list-style-type: none"> ▶ Knowledges, skills, and abilities (e.g., ability to recall facts, understanding of theory and instruments, and knowledge of basic math), specifically in relation to superior performance ▶ Personality characteristics such as reliability, dependability, and work habits (e.g., willingness to take on extra work) that could be used to identify superior workers ▶ Physical demands including coordination (e.g., manipulation of tools) and strength and stamina as in handling heavy objects ▶ Work habits (e.g., taking initiative, working independently, and willingness to take an overload of work) 	<ul style="list-style-type: none"> ▶ Importance/significance of various job elements based on the following behavioral ratings: 1) marginal behavior (i.e., the number of barely acceptable workers who have it); 2) superior behavior (i.e., the number of superior workers who have it); 3) behavior likely to cause trouble if not considered; and 4) element practicality (i.e., whether applicants can be expected to have this element)

Exhibit 22-15**Occupational Information Network (O*NET): Summary****O*NET Recommend Applicability to SSA**

O*NET was developed using a job analysis methodology that focuses primarily on surveys, with supplementary use of interviews and reviews of written material. However, for a variety of reasons, O*NET is not suitable for supporting all SSA disability determinations. There are, however, many aspects of O*NET that would be useful for SSA to consider as it develops its OIS.

Effective features that SSA might want to consider:

- The use of an instrument that focuses on generalizable “person” requirements (i.e., skills and abilities) provides data for cross-job comparison on the aspects of the job that are most directly affected by disabilities.
- The hierarchical arrangement and use of the content domain, so that different users can access it at different levels of detail.
- A nationwide database supported and maintained by an external entity with no vested interest in particular SSA disability determinations.
- In general, the scales used in O*NET are well supported by research, although many of the scales might not be relevant for SSA and there are important constructs that are not covered by the scales.
- The use of level scales anchored with observable behaviors.

Limitations for the SSA context:

- When administered to incumbents, some items will likely have low reliability relative to instruments like the CMQ because the constructs are not observable.
- O*NET ability scales tend to provide details on the variation of jobs at the high end of many abilities (e.g., the difference between an athlete and an astronaut), whereas SSA might be more interested in getting information about the variation in the jobs at the low end of abilities (e.g., the difference between a parking lot attendant and a cashier).
- The O*NET database and data collection enterprise tends to focus on differentiating future-oriented, high-tech jobs requiring special skills as opposed to differentiating low skill jobs that are usually the focus of disability claims.
- As with any incumbent/supervisor survey, SSA will need to identify and apply methods to encourage a high response rate among incumbents and supervisors. Note, however, that we would not recommend that SSA use the O*NET in this manner.

Exhibit 22-15 (Continued)
Occupational Information Network (O*NET): Summary

O*NET Data Collection

Tools	Target Procedure(s)	Example Types of Data Collected	Example Scaling
<ul style="list-style-type: none"> ▶ O*NET questionnaire includes 41 generalized work activities, 120 knowledges, skills, and abilities, 16 work styles or personal characteristics, 57 work context questions, as well as questions about required education, training, and experience ▶ Organizational materials (e.g., job descriptions and training materials) are reviewed by the analyst as one of the first steps in the job analysis process, in order to help the analyst better understand the position and associated duties. ▶ Computers are used to assist in recording the data collected during interviews with organizational representatives and computer software is used to enter the job analysis data 	<ul style="list-style-type: none"> ▶ Review of written materials ▶ Survey ▶ Structured interview ▶ Assessment of physical demands 	<ul style="list-style-type: none"> ▶ Task descriptions, including work activities (e.g., getting information necessary to do the job, evaluating information, and estimating or judging) ▶ Knowledges (e.g. mathematics, business, and sales), skills (e.g., active listening, critical thinking, persuasion, and technical skills), and abilities (e.g., oral comprehension, fluency of ideas, and mathematical reasoning) ▶ Personality characteristics, including worker values (e.g., needing a feeling for accomplishment, fairness, and independence) and personal characteristics (e.g., persistence, initiative, and concern for others) ▶ Environmental conditions (e.g., work location, structural job characteristics, and job hazards) and work context (e.g., interpersonal relationships) ▶ Physical demands (e.g., handling and moving objects, body positions, repetitive motions, body coordination, and body flexibility) ▶ Minimum entry qualifications (e.g., previous work experience, licenses, certificates, or registrations necessary for the job) ▶ Cognitive demands (e.g., dealing with distractions, reasoning/decision making, and problem solving) 	<ul style="list-style-type: none"> ▶ Most of the items on the questionnaire are rated on Likert-type scales, with the remainder of the items being checklists (e.g., check all types of training that apply to the job) ▶ Items on the questionnaire were initially rated on three different types of scales (e.g., level of the characteristic needed, importance, and frequency), but updates to the questionnaire removed the rating of the level needed for items that are reported as not important, and the questionnaire no longer includes items about frequency

Exhibit 22-16
Position Analysis Questionnaire: Summary**PAQ Recommend Applicability to SSA**

The PAQ is an existing job analysis model that uses a standardized 195-item instrument to collect data, which is typically completed by a job analyst based upon data collected in job observations and interviews. The PAQ collects a specific set of data that is not likely to be in line with SSA's needs; however, this model provides an example of a highly-regarded approach that uses observation and interview procedures to inform the completion of a standardized work analysis instrument. If SSA were to adopt a strategy involving observation and interview followed by analyst ratings, there are several aspects of the PAQ that SSA might want to incorporate into the OIS.

Effective features that SSA might want to consider:

- The method of conducting interviews and observations to gather job specific information provides data for understanding the job.
- The use of an instrument that focuses on generalizable work activities provides data for cross-job comparison.
- In general, the scales are well supported by research, although many of the scales might not be relevant for SSA and there are important constructs that are not covered by the scales.
- The focus on observable behaviors ensures greater verifiability of the findings, however, observable behaviors might not have as much utility for disability examiners.

Limitations for the SSA context:

- The constructs are at a level of abstraction that may not provide a clear picture of the job.
- Scores on these scales would need to be transformed to provide meaningful interpretation for disability determination.

Exhibit 22-16 (Continued)
Position Analysis Questionnaire: Summary

PAQ Data Collection

Tools	Target Procedure(s)	Example Types of Data Collected	Example Scaling
<ul style="list-style-type: none"> ▶ 195-item position analysis questionnaire (PAQ) that collects data on the following 6 major elements: 1) information input (e.g., visual sources of job); 2) mental processes (e.g., decision making, reasoning and planning/scheduling); 3) work output (e.g., level of physical exertion); 4) relationships with other people (e.g., advising); 5) job context (e.g., outside physical working conditions); and 6) other job characteristics (e.g., apparel worn) ▶ Organizational materials (e.g., position descriptions, organizational charts, or training materials) are reviewed by the analyst as one of the first steps in the job analysis process, in order to help the analyst better understand the position and associated duties. ▶ Hard copy notes are taken during the collection of all data (e.g., while reviewing materials or observing the job) in order to complete the PAQ at a later time ▶ Computer software may be used to assist in processing the data by making ratings on the PAQ through identifying attributes associated with PAQ items from the program's analyses of existing worker qualification data 	<ul style="list-style-type: none"> ▶ Review of written materials ▶ Job observation ▶ Survey ▶ Structured interview ▶ Focus groups ▶ Assessment of physical demands 	<ul style="list-style-type: none"> ▶ Task descriptions, including items that assess and describe tasks, such as estimation activities (e.g., inspecting), decision making, reasoning, and planning/ scheduling, manual activities (e.g., assembling/ disassembling), oral communication, and written or print communications ▶ Tools, equipment, and work aides (e.g., measuring devices, mechanical devices, hand-held tools or instruments, use of other hand-held devices, use of stationary devices, use of control devices, transportation and mobile equipment, and apparel worn) ▶ Environmental conditions/Work context (e.g., outdoor and indoor physical working conditions, physical hazards, and personal and social aspects of each job) ▶ Physical demands (e.g., sensory perceptual processes, body balance, full body activities, level of physical exertion, body positions and postures, and manipulation and coordination activities) ▶ Cognitive demands (e.g., information processing activities, short-term memory and time pressure) ▶ Training and educational requirements (e.g., educational level, job-related experience, and training or certifications) 	<ul style="list-style-type: none"> ▶ The PAQ has six rating scales: 1) Extent of Use; 2) Importance to This Job; 3) Amount of Time; 4) Possibility of Occurrence; 5) Applicability; and 6) Item-Specific scales (e.g., Difficulty) ▶ The PAQ also contains items that measure work schedule, pace, travel, compensation, and exempt status

**Exhibit 22-17
Task Inventory: Summary**

TI Recommend Applicability to SSA

The Task Inventory approach involves collecting data through procedures such as review of written materials, job observation, interviews, and surveys to ultimately develop a list of task descriptions. Although this method is well validated and highly regarded, it is a time consuming approach that focuses specifically on tasks. If used by SSA, it would need to be combined with other procedures to gather additional types of data.

Effective features that SSA might want to consider:

- The method of conducting interviews and observations to gather job specific information provides data for understanding the job.

Limitations for the SSA context:

- There are no generalizable constructs or scales to allow for cross-job comparison.
- The process is too lengthy and costly for SSA’s purposes.

TI Data Collection

Tools	Target Procedure(s)	Example Types of Data Collected	Example Scaling
<ul style="list-style-type: none"> ▶ Structured interview-recording form consists of 3 columns: 1) inputs that stimulate action; 2) actions performed; and 3) outputs or results of actions ▶ Organizational materials (e.g., Job descriptions, training materials, organizational charts, resumes, management objective lists, equipment descriptions, operations plans, maintenance manuals, work flows, and previous task lists) can be used to help the analyst identify tasks ▶ Hard copy notes are taken while conducting the job observation and interview to assist the analyst in the development of initial and final task statements ▶ Computer/Computer software is useful to assist the analyst in organizing, managing, and analyzing large amounts of task data 	<ul style="list-style-type: none"> ▶ Review of written materials ▶ Job observation ▶ Survey ▶ Structured interview 	<ul style="list-style-type: none"> ▶ Task descriptions (e.g., work activities) that describe what, for whom, why, and how a task is performed ▶ Environment conditions/Work context (e.g., noise, temperature, lighting) ▶ Tools, equipment, and work aides (e.g., information about people, paper materials, office supplies, equipments, or systems) ▶ Other data, including information about personal items (e.g., company or job tenure, demographic information) 	<ul style="list-style-type: none"> ▶ Importance/significance of tasks (e.g., degree of involvement, criticality to the job) ▶ Duration of tasks (e.g., time spent performing task) ▶ Frequency of job characteristics ▶ Complexity of tasks (e.g., level of difficulty for others to learn, the ability for others to cover for the incumbent) ▶ Satisfaction with the task

Exhibit 22-18
Threshold Traits Analysis: Summary
TTA Recommend Applicability to SSA

TTA collects worker trait, job demand, and job function data using data collection procedures such as review of written materials, job observations, interviews, and surveys. As this is a standardized approach, it is not likely to collect all of the data needed by SSA; however, it serves as a useful example of an approach that combines data collected through multiple data collection procedures. If SSA were to adopt a strategy involving observation and interview followed by analyst ratings, there are several aspects of the TTA that SSA might want to incorporate into the OIS.

Effective features that SSA might want to consider:

- The method of conducting interviews and observations to gather job specific information provides data for understanding the job.
- The use of an instrument that focuses on generalizable “person” requirements (i.e., skills and abilities) provides data for cross-job comparison on the aspects of the job that are most directly affected by disabilities.
- The 33 traits include a parsimonious and simply worded set of constructs that might provide an effective perspective for sorting and locating jobs that people with disabilities can perform. This facility, coupled with a short job-specific task description would be a powerful combination for SSA.
- In general, the TTA is well supported by research.

Limitations for the SSA context:

- When administered to incumbents, the TTA Scales will likely have low reliability relative to instruments like the CMQ because the constructs are not observable.
- SSA would need more detail than is provided via the 33 trait focused scales (e.g., physical exertion is covered by only two constructs).
- In our judgment, the TTA rating tool is not appropriate for use as incumbent/supervisor survey. It should only be used by trained analysts.
- The TTA is not commercially available. It appears that the only way to use it is to contract with Lopez and Associates.

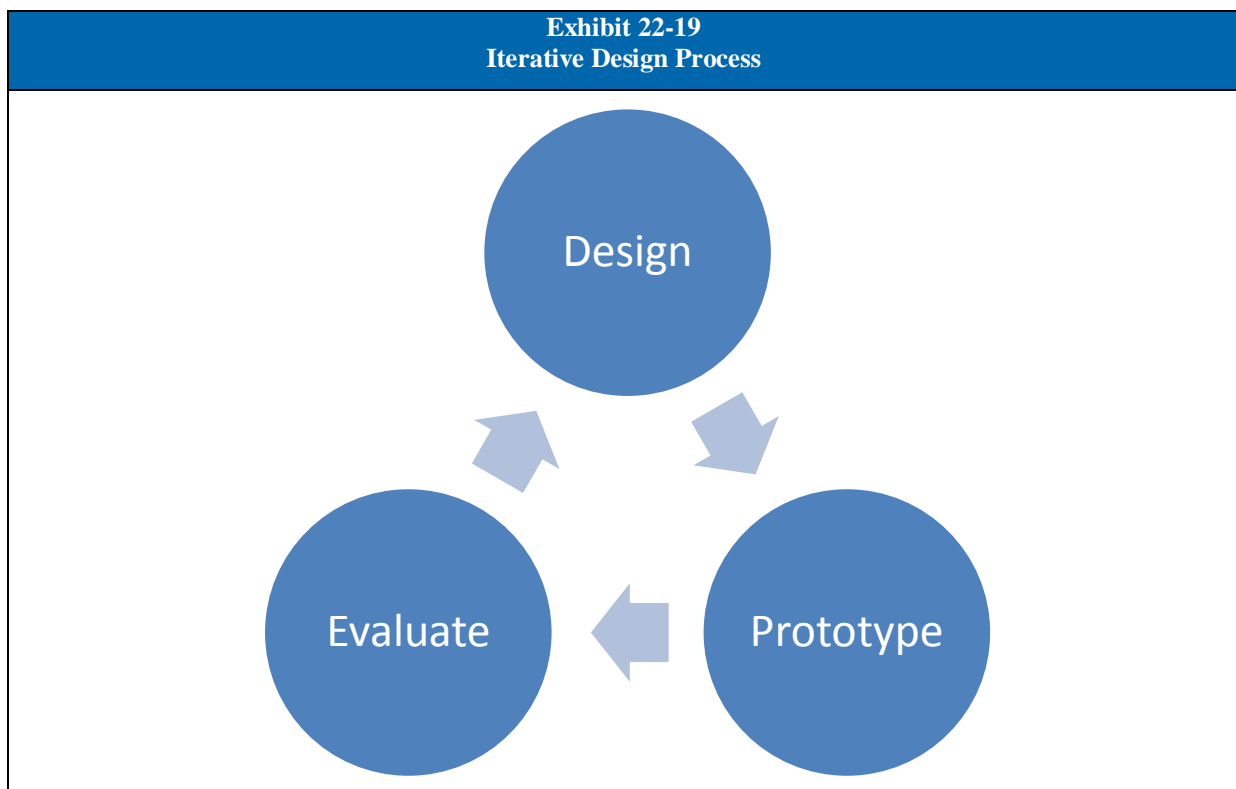
Exhibit 22-18 (Continued)
Threshold Traits Analysis: Summary

TTA Data Collection

Tools	Target Procedure(s)	Example Types of Data Collected	Example Scaling
<ul style="list-style-type: none"> ▶ Threshold Trait Analysis (TTA) Questionnaire is administered to supervisors that measures a standard set of 21 job functions, worker demands, and 33 traits across 5 areas: 1) Physical (e.g., stamina, agility); 2) Mental (e.g., perception, memory, problem solving); 3) Learned (e.g., planning, decision making, communication); 4) Motivational (e.g., dependability, initiative); and 5) Social (e.g., cooperation, tolerance, influence) ▶ Demand and Task Analysis Questionnaire is adapted from job-specific task information and is administered to incumbents to learn more about job functions and related work demands ▶ Organizational materials (e.g., job descriptions and training materials) are used to help the analyst better understand the traits associated with the job 	<ul style="list-style-type: none"> ▶ Review of written materials ▶ Job observation ▶ Survey ▶ Structured interview ▶ Assessment of physical demands 	<ul style="list-style-type: none"> ▶ Personality characteristics (e.g., motivational factors, social traits) ▶ Environmental conditions/Work context (e.g., work location, interactions with individuals, types of deadlines, environmental demands) ▶ Knowledges, skills, and abilities (e.g., required mental and learned traits) ▶ Physical demands (e.g., physical exertion and vigilance) ▶ Cognitive demands (e.g., attention and information processing) ▶ Task descriptions (e.g., person-related tasks, number of tasks in the job) 	<ul style="list-style-type: none"> ▶ Categorizes traits as ‘can do’ (e.g., traits that are describe as abilities and include physical, mental and learned worker characteristics) and ‘will do’ (e.g., attitudinal, motivational, and social characteristics) ▶ Task relevance to the job ▶ Task uniqueness and practicality ▶ Importance/significance of tasks

Summary: Overarching Recommendations and Potential Next Steps. In this final section, overarching recommendations and potential next steps are provided. These proposed recommendations are based on our current understanding of SSA's OIS project objectives and should be considered when determining future project activities.

- **Fully conceptualize multiple prototypes of the integrated system that SSA might use and compare the systems side-by-side.** It will be necessary for SSA to choose data collection and analysis features from different practices and combine them into one methodology that will serve as an integrated system for SSA's Occupational Information System (OIS). This integrated system would be referred to as the occupational analysis system (i.e., the data collection and analysis portion of the OIS). To fully understand the potential utility of a practice, it should be viewed as part of a potential occupational analysis system. This will allow SSA to see how that particular practice supports and is supported by other pieces of the system. Given that there are multiple approaches for designing an occupational analysis system, we suggest that SSA develop a complete conceptual prototype for each of these approaches. Then the various job analysis practices can be examined in the context of each of these conceptual prototypes. Later, the prototype occupational analysis systems may need to undergo a more complete iterative design process where the prototypes are further specified, evaluated, and then redesigned in an iterative fashion on the way to a the most appropriate and effective solution. This iterative design process is illustrated in Exhibit 22-19.



- **Identify Work Taxonomy and Constructs to be Measured.** As discussed above, multiple different practices/tools will need to be combined to populate the OIS. To determine the ideal composition of the final data collection methodology, and to completely assess the relevance and usefulness of the different practices and models, SSA will need to specify the constructs to be measured during the job

analysis (perhaps in the form of one or more complete conceptual prototypes as suggested above). For example, a system that focuses on skills and abilities may necessitate a different data collection procedure than a system that focuses on work behaviors.

- **Data Should be Collected and Stored Using a Computerized System or Online Application/Tool.** Project findings indicate that there is a real concern with regard to the storing and security of job analysis data. Utilization of a computerized format or online tool would provide a centralized location for data collection and minimize potential security issues/concerns of hand written paperwork. We recommend collecting data through a customized, computerized format that would minimize security issues and populate the OIS with Job Analysis Data.
- **Need to Determine Factors that are Most Important and Consider Job Analysis Practices Accordingly.** This project evaluated each of the major job analysis practices identified on a set of eleven different criteria and across numerous categories. To distinguish between practices, SSA will need to identify its most important criteria and factors before finalizing the job analysis methodology. For example, SSA may want to develop an evaluation system that includes two phases: the first phase would involve evaluating practices using required criteria that must be met in order for the practice to be considered (e.g., legal defensibility), while the second phase would involve using the less crucial criteria, such as return on investment, to distinguish among the job analysis practices that meet the initial requirements.
- **Full Methodology Must Include a Comprehensive Set of Procedures that Include Guidelines for Maintaining Data Security and Confidentiality.** Beyond determining procedures for how job analysts must collect the data, SSA will also need to develop procedures for how the data must be handled, including procedures for ensuring confidentiality of data for the participating organizations, as well as securely submitting the collected data. While some job analysis practices may be more inclined to ensure data security or confidentiality, these types of considerations can largely be addressed by implementing specific guidelines, independent of the final data collection procedures that are selected.
- **Features of Existing Job Analysis Models Should be Adapted for SSA's Specific Purposes and Data Needs.** This project report provides detailed descriptions and evaluations of numerous job analysis models. While several of these models may meet a number of SSA project objectives, consideration should be given to adapting features of these models to fully address OIS requirements once the content model is developed. For SSA's purposes, additional job analysis questions or more precise questions may need to be added to an existing questionnaire to collect data granular enough to capture information specific to an occupation.
- **Need Pilot Testing to Ensure that the Final Methodology Meets SSA Objectives.** Once a draft job analysis method is created, the method must be thoroughly pilot tested. Pilot testing will ensure the final set of combined data collection procedures and/or models appropriately measure the desired core tasks, work activities, contextual characteristics and minimum KSA. Based on pilot test results, refinements can be made to the methodology before analysts begin collecting 'live' data to populate the OIS.

Each of these recommendations should inform the development of final job analysis methodology as well as future related BPA activities.

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Appendix A

Focus Group Protocol Questions

FACILITATOR VERSION

Facilitator Name: _____ Recorder Name: _____

Date: _____ Time: _____ No. of Participants: _____

Introduction:

Hello, I am (*your name*) from ICF International and I will be the facilitator for our phone focus group today. ICF is based in Fairfax, Virginia and we provide a variety of workforce development and human capital management consulting services. We have been contracted by the Social Security Administration to conduct this study. For a brief overview of the study:

Project Background:

The Social Security Administration (SSA) is undertaking a project to develop a new occupational information system (OIS) tailored specifically for the SSA’s disability programs and adjudication process. To collect the job data for its OIS, SSA must train individuals as job analysts to analyze work using a variety of techniques and processes that will allow them to obtain detailed descriptions, specifications, measurements and requirements for jobs throughout the labor market of the United States. The job analysts will then use that data to make ratings using a work analysis instrument developed by SSA. Our focus for this study is how to best collect the data to inform those ratings and on training candidates in the conduct of job analysis—not the design of the work analysis instrument itself.

Our team at ICF International is currently working with SSA on two initiatives related to this project: (1) Developing the job analysis methodology that job analysts will use to collect occupational data and (2) Designing a business strategy for the training, certifying, and recruiting of job analysts across the U.S. As a part of this effort, we are developing content to describe the systematic process required for conducting job analysis as well as a detailed description of the job analyst qualifications, roles and procedures. In addition, we are determining the training needs and certificate specifications required for successful accomplishment of the analyst’s tasks.

During our discussion today, we will be asking for your perspective on a number of related topics. Do you have any questions before we begin? Please note this meeting is being recorded to ensure accuracy of data collected. We also have an individual on the phone (state recorder’s name) who will be taking notes throughout the call. Do you have any concerns with this? (As part of informed consent, ensure you get a verbal confirmation from all on the phone.)

1. Ground Rules

- Before we get started with introductions, I think it is important to take a minute to discuss some general ground rules to make sure we are all on the same page. These include:
 - To keep this focus group to 1 hour, please be concise in providing your responses to allow for everyone to participate. Please note that as the facilitator, I may have to interrupt at times to move us to the next questions. If that occurs, I may ask you to send your further thoughts to me via email.
 - Respect each other's opinions. I ask that you withhold your judgments about others comments.
 - Avoid interrupting other participants.
 - Keep information shared here confidential. We intend to remove individuals' names and other identifying information from our notes.
 - Please stay on topic and provide responses that relate directly to the question asked.
 - Any others you would like to add to this?

2. Introduction

- In 30 seconds, please briefly introduce yourself and briefly describe what you do in your job. (*Note to interviewer: State that for introductions, you will call on participants in alphabetical order.*)
- Please briefly describe the types of data that you typically collect, or have collected, during job analyses.
 - Probes:
 - Potential types of data that SMEs may mention they have collected: Tasks, worker functions, KSAs, physical demands, cognitive demands, personality characteristics, environmental conditions, training & educational requirements, minimum entry qualifications, tools/equipment/work aids, importance/frequency of activities

2. Job Analysis Procedure

- Which procedures do you typically use to gather job analysis data?
 - Probes:
 - Which of the following procedures do you use: review of written materials, surveys, interviews, focus groups, job observation, measurement of physical demands
 - Are your methods related to a particular job analysis model?
- How do you know which method(s) are appropriate for a given situation and what types of tools do you use to collect the data?
 - Probes:
 - Who/where is data collected from? For example, which of the following sources do you use: incumbents, direct supervisors, executive leadership, HR, customers/clients, organizational materials?

- What are some key considerations when conducting job analyses for the purpose of making disability determinations?
 - Probes:
 - How do you collect data on the physical demands of the job?
 - How do you collect data on the mental demands of the job?
- What procedures should be in place to ensure that consistent and reliable data are being collected across analysts and locations?
 - Probes:
 - How should analysts transfer data back to central database?
 - Should the data be subject to an auditing process? If so, what are the recommended specifications for auditing (e.g., what percentage of data should be reviewed; how should data be identified for auditing)?

4. Practice Evaluation Criteria

- What are the most important criteria to consider when evaluating different job analysis practices and data collection procedures?
 - Probes:
 - Objective of the job analysis?
 - Standardization to ensure that minimal error is introduced?
 - Flexibility to consider a variety of organizational and occupational circumstances?
 - Monetary Cost?
 - Time to execute procedures?
 - Data security to protect the rights and interests of employers and employees providing information?
 - Detail of data collected?
 - Invasiveness?
 - Ability of method to aggregate geographically diverse data?

5. Job Analyst Qualifications

- As part of the data collection process, SSA will need to hire job analysts around the U.S. If you have not already done so, please take a moment to look over the draft list of knowledge, skills, and abilities needed to be an effective job analyst. Broadly speaking, do you suggest making any additions, changes, or deletions to this list? (Note: The draft KSA list was provided in their confirmation email.)
- What certification, certificate and/or training programs does your field require in order to conduct job analysis?
- What should the minimum qualifications be for a candidate to be hired as job analyst, considering all incoming analysts will receive job training from SSA?
 - Probes:
 - What educational background should be required?
 - What types of previous work experience should be required?

6. Job Analyst Training Approaches

- In training candidates to conduct job analysis, what are some key factors that need to be emphasized during the training?
 - Probes:
 - What are some of the most complex aspects of conducting job analysis?
 - What are some of the most common challenges that emerge in the conduct of job analysis?
 - What are some of the key decisions that analysts need to make?
 - *(Keep in mind that these analysts will be given assignments of which jobs to study and who to contact so they will not need to make those decisions.)*
 - What are some procedural considerations or standard that can impact the quality of data collected?
- What training programs, practices or strategies are available for training job analysts, considering the training would need to be replicated in various geographical locations?
- What resources should be introduced in a training to prepare individuals, possibly with no prior experience, to conduct job analysis at a national level?
- What are the benefits and disadvantages to consider with the use of each of the following training approaches for a large-scale training initiative?
 - In-person instructor led
 - Self-paced online training
 - Distance learning (instructor led)
 - Webcasts
 - Multi-media training (e.g., CD-ROM; audio/video)
 - Blended/Mixed method delivery
 - Reference documentation (ongoing training source)
 - Group Discussion Forums
 - Others

7. Summary

- Thank you very much for your time today. Are there any additional resources that you can recommend before we end the focus group?
 - Probes:
 - Can you point us to key literature or technical reports?
 - Do you have examples of similar projects that have required the conduct of job analysis on a national level?
 - Are there other experts we should interview? Do you have their contact information?

Thank you for your time. If we have follow-up questions, are you comfortable with us contacting you with those? If you have any questions or would like to share more information, please do not hesitate to contact me. My contact information is *(provide phone and email)*. As for next steps, we are very early in the project at this point. Within the next 6 months, we will be collecting additional data from various sources and integrating that data to provide strategies and effective practices to SSA.

Appendix B

Call Order 0001 Microsoft Access Literature Review Database Form

Appendix B provides a screenshot of the data entry form that was created in Microsoft Access for the literature review database. This data entry form was used to ensure that all necessary information was entered in the database from each literature review article. It includes check boxes and text boxes associated with all of the framework categories.

<p>Relevancy of TOPIC to Project</p> <input type="checkbox"/> Not at all relevant <input type="checkbox"/> Somewhat relevant <input type="checkbox"/> Relevant <input type="checkbox"/> Very relevant	<p>Sufficient Detail to Draw Concl. about METHOD</p> <input type="checkbox"/> No methodological detail <input type="checkbox"/> Some methodological detail <input type="checkbox"/> Adequate methodological detail <input type="checkbox"/> Significant methodological detail	<p>QUALITY of Article</p> <input type="checkbox"/> Unknown publishing source/Questionable writing qual <input type="checkbox"/> Non-expert publishing source <input type="checkbox"/> Non-peer-reviewed, but reputable/expert source <input type="checkbox"/> Peer-reviewed source	<p>UP-TO-DATE Information</p> <input type="checkbox"/> Information is outdated and no longer useful <input type="checkbox"/> Information is outdated and somewhat useful <input type="checkbox"/> Information is outdated but still useful <input type="checkbox"/> Information is current
<p>Overview Information</p> <p>Technique Name: <input type="text"/> APA Citation: <input type="text"/></p> <p>Data Gathering Procedure</p> <input type="checkbox"/> Review of Written Materials <input type="checkbox"/> Paper-and-Pencil Survey <input type="checkbox"/> Face-to-Face Interview <input type="checkbox"/> Face-to-Face Focus Group <input type="checkbox"/> Measurement of Physical Demands <input type="checkbox"/> Unspecified <input type="checkbox"/> Job Observation <input type="checkbox"/> Web-Based Survey <input type="checkbox"/> Phone Interview/Survey <input type="checkbox"/> Phone Focus Group <input type="checkbox"/> Other Procedure Type Name of Other Procedure: <input type="text"/> Description of Procedure: <input type="text"/>			
<p>Task-Attribute Linkage (Describes a way to link activities or tasks to individual attributes)</p> <input type="checkbox"/> Yes <input type="checkbox"/> No Description of Task-Attribute Linkage: <input type="text"/>			
<p>Sampling Guidance Provided</p> <input type="checkbox"/> Yes <input type="checkbox"/> No Description of Sampling Guidance Provided: <input type="text"/>			
<p>Data Source</p> <input type="checkbox"/> Incumbents Description of Data Source: Incumbents: <input type="text"/> <input type="checkbox"/> Direct Supervisors Description of Data Source: Direct Supervisors: <input type="text"/> <input type="checkbox"/> Human Resources Professionals Description of Data Source: Human Resource Professionals: <input type="text"/> <input type="checkbox"/> Organizational Materials Description of Data Source: Organizational Materials: <input type="text"/> <input type="checkbox"/> Executive Leadership Description of Data Source: Executive Leadership: <input type="text"/> <input type="checkbox"/> Other Data Source Description of Data Source: Other Data Source: <input type="text"/> <input type="checkbox"/> Customers/Clients Description of Data Source: Customers/Clients: <input type="text"/> <input type="checkbox"/> N/A			
<p>Relationship to Existing Job Analysis Model (if any)</p> <input type="checkbox"/> Threshold Traits Analysis <input type="checkbox"/> Ability Requirements Scales <input type="checkbox"/> Position Analysis Questionnaire (PAQ) <input type="checkbox"/> Critical Incident Technique <input type="checkbox"/> Cognitive Task Analysis <input type="checkbox"/> Job Components Inventory (JCI) <input type="checkbox"/> Fleishman Ability Requirements Scales <input type="checkbox"/> Functional Job Analysis (FJA) <input type="checkbox"/> Strong-Campbell Vocational Inventory Holland's Taxonomy <input type="checkbox"/> Job Elements Model <input type="checkbox"/> Task and Demands <input type="checkbox"/> Task Inventory/CODAP <input type="checkbox"/> N/A <input type="checkbox"/> Competency Modeling <input type="checkbox"/> Other Model Name: <input type="text"/> Name of Other Model: <input type="text"/> Description of Relationship: <input type="text"/>			
<p>Discipline</p> <input type="checkbox"/> Physical and Occupational Therapy <input type="checkbox"/> Occupational Health <input type="checkbox"/> I/O Psychology <input type="checkbox"/> Ergonomics <input type="checkbox"/> Vocational Rehabilitation <input type="checkbox"/> Human Resources <input type="checkbox"/> Other Discipline: <input type="text"/> Description of 'Other Discipline': <input type="text"/>			
<p>Description and Documentation of Job Analysis Procedures</p> <p>Type of Job Analysis Data Collected</p> <input type="checkbox"/> Task Descriptions Description of Data Collected: Task Descriptions: <input type="text"/> <input type="checkbox"/> Worker Functions Description of Data Collected: Worker Functions: <input type="text"/> <input type="checkbox"/> Minimum Entry Qualifications Description of Data Collected: Minimum Entry Qualifications: <input type="text"/> <input type="checkbox"/> Knowledges, Skills and Abilities Description of Data Collected: Knowledges, Skills and Abilities: <input type="text"/> <input type="checkbox"/> Physical Demands Description of Data Collected: Physical Demands: <input type="text"/> <input type="checkbox"/> Tools, Equipment, and Work Aids Description of Data Collected: Tools, Equipment, and Work Aids: <input type="text"/> <input type="checkbox"/> Cognitive Demands Description of Data Collected: Cognitive Demands: <input type="text"/> <input type="checkbox"/> Personality Characteristics Description of Data Collected: Personality Characteristics: <input type="text"/> <input type="checkbox"/> Importance/Frequency of Activities/ Characteristics Description of Data Collected: Importance/Freq of Act/Character: <input type="text"/> <input type="checkbox"/> Environment Conditions/Work Context Description of Data Collected: Environment Cond/Work Context: <input type="text"/> <input type="checkbox"/> Training and Educational Requirements Description of Data Collected: Training and Edu Requirements: <input type="text"/> <input type="checkbox"/> Other Data Collected Description of Data Collected: Other Data Collected: <input type="text"/>			

Data Documenting Tools Used

Measuring Tape
Description of Tool Measuring Tape: _____

Pressure Gauge
Description of Tool Pressure Gauge: _____

Camera
Description of Tool Camera: _____

Pedometer
Description of Tool Pedometer: _____

Scale
Description of Tool Scale: _____

Video Recorder
Description of Tool Video Recorder: _____

Voice Recorder
Description of Tool Voice Recorder: _____

PDA Device
Description of Tool PDA Device: _____

Hard Copy/Structured Note Pages
Description of Tool Hard Copy/Structured Note Pages: _____

Computer Software
Description of Tool Computer Software: _____

Work/Job Analysis Instrument N/A
Description of Tool Work/Job Analysis Instrument: _____

Other Tool
Name of Other Tool #1: _____ Name of Other Tool #2: _____
Description of Tool Other Tool #1: _____ Description of Tool Other Tool #2: _____
Name of Other Tool #3: _____ Name of Other Tool #4: _____
Description of Tool Other Tool #3: _____ Description of Tool Other Tool #4: _____
Name of Other Tool #5: _____
Description of Tool Other Tool #5: _____

Data Aggregation, Quality, and Analysis Considerations

Level of Detail in Data Collected

General Moderate Precise N/A

Description of Level of Detail: _____

Level of Job Performance Measured

Minimal Average Maximal N/A

Description of Level of Job Performance Measured: _____

Validity of Data

Low Moderate High N/A

Description of Validity: _____

Reliability of Data/Standardization of Procedures

Low Standardization Moderate Standardization Complete Standardization N/A

Description of Reliability / Standardization: _____

Security of Data

Low Moderate High N/A

Description of Security: _____

Ease of Aggregation

Easy Moderate Difficult N/A

Description of Aggregation Procedure: _____

Resources Needed and Logistical Consideration

Length of Time to Develop

Short Medium Long N/A

Description of Development: _____

Monetary Cost to Develop

Inexpensive Moderate Expensive N/A

Description of Associated Monetary Costs to Develop: _____

Length of Time to Administer

Short Medium Long N/A

Description of Time Requirements: _____

Monetary Cost to Administer

Inexpensive Moderate Expensive N/A

Description of Associated Monetary Costs to Administer: _____

Resource(s) Required of Admin. for Incumbent or Analyst

Web Access Telephone Access Workspace Access Computer Transportation Meeting Space N/A Other

Name of Other Resource Required: _____

Description of Resource(s) Required for Administration: _____

Summary Description

Positive/Negative Aspects of Gathering Procedure

Positive Aspects of Gathering Procedure: _____

Negative Aspects of Gathering Procedure: _____

Assessment of Further Consideration

Yes Maybe No

Description of Assessment of Further Consideration: _____

Notes

Description of Notes: _____

Appendix C

Call Order 0001 Framework for Describing Job Analysis Practices

Appendix C includes the framework for describing job analysis practices in the literature review. This is the framework that was used to organize data collected during the literature review process and is included here for informative and archival purposes. The framework was used to train the literature review team to ensure that all members understood the framework categories and responses options included in the literature review process.

Appendix C Call Order 1 Framework for Describing Job Analysis Practices <i>Underlying Structure for Access Database</i>	
Column Title	Data Entry Options
Overview Information	
Technique Name	[Fill in]
Data Gathering Procedure Type	[Select One and then Describe] <ul style="list-style-type: none"> ▪ Review of Written Materials ▪ Job Observation ▪ Paper-and-Pencil Survey ▪ Web-Based Survey ▪ Phone Interview ▪ Face-to-Face Interview ▪ Phone Focus Group ▪ Face-to-Face Focus Group ▪ Measurement of Physical Demands ▪ Unspecified ▪ Other Procedure Type _____
<i>Description of Procedure</i>	[Fill in]
Relationship to Existing Job Analysis Model (if any)	[Select All that Apply and then Describe] <ul style="list-style-type: none"> ▪ Threshold Traits Analysis ▪ Position Analysis Questionnaire (PAQ) ▪ Critical Incident Technique ▪ Task inventory/CODAP ▪ Cognitive Task Analysis ▪ Job Components Inventory (JCI) ▪ Fleishman Ability Requirements Scales ▪ Functional Job Analysis (FJA) ▪ Competency Modeling ▪ Strong-Campbell Vocational Inventory (Holland's Taxonomy) ▪ Job Elements Model ▪ Task and Demands Analysis (AET) ▪ Other Model Name _____ ▪ N/A
<i>Description of Relationship</i>	[Fill in]

Appendix C (Continued) Call Order 1 Framework for Describing Job Analysis Practices <i>Underlying Structure for Access Database</i>	
Discipline	[Select One] <ul style="list-style-type: none"> ▪ Vocational Rehabilitation ▪ Physical and Occupational Therapy ▪ Human Resources ▪ I/O Psychology ▪ Ergonomics ▪ Occupational Health ▪ Other Discipline
<i>Description of 'Other Discipline':</i>	[Fill in]
APA Citation	[Fill in]
Data Source	[Select All that Apply and then Describe] <ul style="list-style-type: none"> ▪ Incumbents ▪ Direct Supervisors ▪ Executive Leadership ▪ Human Resources Professionals ▪ Customers/Clients ▪ Organizational Materials (e.g., records, policies and procedures, job descriptions) ▪ Other Data Source ▪ N/A
<i>Description of Data Source</i>	[Fill in]
Task-Attribute Linkage	[Select One and then Describe] <ul style="list-style-type: none"> ▪ No. Does not describe a way to link activities or tasks to individual attributes ▪ Yes. Describes a way to link activities or tasks to individual attributes
<i>Description of Task-Attribute Linkage</i>	[Fill in]
Sampling Guidance Provided	[Select One and then Describe] <ul style="list-style-type: none"> ▪ No. Does not provide any sampling guidance of data source. ▪ Yes. Describes how to sample data sources (e.g., incumbents)
<i>Description of Sampling Guidance Provided</i>	[Fill in]

Appendix C (Continued)
Call Order 1 Framework for Describing Job Analysis Practices
Underlying Structure for Access Database

Description and Documentation of Job Analysis Procedures

<p>Type of Job Analysis Data Collected</p>	<p>[Select All that Apply and then Describe]</p> <ul style="list-style-type: none"> ▪ Task Descriptions ▪ Knowledges, Skills and Abilities ▪ Cognitive Demands ▪ Environment Conditions/Work Context ▪ Worker Functions (<i>e.g., Interactions with data people things</i>) ▪ Physical Demands ▪ Personality Characteristics (<i>e.g., Attitudes, Temperaments, Interests, Values</i>) ▪ Training & Educational Requirements ▪ Minimum Entry Qualifications ▪ Tools, Equipment, and Work Aids ▪ Importance/Frequency of Activities/ Characteristics ▪ Other Data Collected ▪ N/A
<p><i>Description of Data Collected</i></p>	<p>[Fill in]</p>
<p>Data Documenting Tools Used</p>	<p>[Select All that Apply and then Describe]</p> <ul style="list-style-type: none"> ▪ Measuring Tape ▪ Pedometer ▪ Voice Recorder ▪ Computer Software (<i>e.g., Microsoft Word or Excel</i>) ▪ Pressure Gauge ▪ Scale ▪ PDA Device ▪ Work/Job Analysis Instrument ▪ Camera ▪ Video Recorder ▪ Hard copy/Structured Note Pages ▪ Other Tool [#1 through # 5] _____ ▪ N/A
<p><i>Description of Tool</i></p>	<p>[Fill in]</p>

Appendix C (Continued) Call Order 1 Framework for Describing Job Analysis Practices <i>Underlying Structure for Access Database</i>	
Data Aggregation, Quality and Analysis Considerations	
Level of Detail in Data Collected	<p>[Select One and then Describe]</p> <ul style="list-style-type: none"> ▪ General: Provides description of job at high level ▪ Moderate: Provides major work activities related or information about working conditions ▪ Precise: Provides numerical representations, exact tasks description, and/or precise facts related to job or incumbent ▪ N/A
<i>Description of Level of Detail</i>	<i>[Fill in]</i>
Level of Performance Measured	<p>[Select One and then Describe]</p> <ul style="list-style-type: none"> ▪ Minimal ▪ Average ▪ Maximal ▪ N/A
<i>Description of Descriptive Vs. Prescriptive</i>	<i>[Fill in]</i>
Security of Data	<p>[Select One and then Describe]</p> <ul style="list-style-type: none"> ▪ Low: Physical transmission of data (e.g., hard mail) ▪ Moderate: Manual entry of data from notes into secure digital medium (e.g., Data entered through web portal) ▪ High: Direct entry of data into secure digital medium (e.g., PDA device) ▪ N/A
<i>Description of Security</i>	<i>[Fill in]</i>
Validity of Data	<p>[Select One and then Describe]</p> <ul style="list-style-type: none"> ▪ Low: Many opportunities for error, judgment to be introduced (<i>e.g., job observations</i>) ▪ Moderate: Few opportunities for error, judgment to be introduced (e.g., surveys) ▪ High: Almost no opportunities for error, judgment to be introduced (<i>e.g., measuring weight of physical objects</i>) ▪ N/A

Appendix C (Continued) Call Order 1 Framework for Describing Job Analysis Practices <i>Underlying Structure for Access Database</i>	
<i>Description of Validity</i>	[Fill in]
Reliability of Data / Standardization of Procedures	[Select One and then Describe] <ul style="list-style-type: none"> ▪ Complete Standardization: Exact replication in every administration (<i>e.g., paper survey</i>) ▪ Moderate Standardization: Moderate flexibility/adaptability (<i>e.g., skip patterns in web survey</i>) ▪ Low Standardization: Complete flexibility/adaptability (<i>e.g., job observation</i>) ▪ N/A
<i>Description of Reliability / Standardization</i>	[Fill in]
Ease of Aggregation	[Select One and then Describe] <ul style="list-style-type: none"> ▪ Difficult: Data must be sorted, coded, and/manually combined (<i>e.g., interview data</i>) ▪ Moderate: Data is cleaned, averaged, then formula is applied (<i>e.g., survey data</i>) ▪ Easy: Numerical data is averaged and mean is used as result (<i>e.g., measuring weight of physical objects</i>) ▪ N/A
<i>Description of Aggregation Procedure</i>	[Fill in]
Resources Needed and Logistical Considerations	
Length of Time to Develop	[Select One and then Describe if Necessary] <ul style="list-style-type: none"> ▪ Short (<i>e.g., less than 1 month</i>) ▪ Medium (<i>e.g., 1-6 months</i>) ▪ Long (<i>e.g., 6 months or longer</i>) ▪ N/A
<i>Description of Development</i>	[Fill in]
Monetary Cost to Develop	[Select One and then Describe] <ul style="list-style-type: none"> ▪ Inexpensive ▪ Moderate ▪ Expensive ▪ N/A

Appendix C (Continued) Call Order 1 Framework for Describing Job Analysis Practices <i>Underlying Structure for Access Database</i>	
<i>Description of Associated Costs to Develop</i>	<i>[Fill in]</i>
Length of Time to Administer	[Select One and then Describe if Necessary] <ul style="list-style-type: none"> ▪ Short (e.g., less than 30 min) ▪ Medium (e.g., 30 min-2 hours) ▪ Long (e.g., 2 hours or longer) ▪ N/A
<i>Description of Time Requirements</i>	<i>[Fill in]</i>
Monetary Cost to Administer	[Select One and then Describe] <ul style="list-style-type: none"> ▪ Inexpensive ▪ Moderate ▪ Expensive ▪ N/A
<i>Description of Associated Costs to Administer</i>	<i>[Fill in]</i>
Requirements of Administration for Incumbent or Analyst (Other than Specific Data Documenting Tool)	[Select One and then Describe] <ul style="list-style-type: none"> ▪ Web-Access ▪ Meeting Space ▪ Telephone Access ▪ Computer ▪ Transportation (e.g., car) ▪ Other ▪ N/A
<i>Description of Administration Requirements</i>	<i>[Fill in]</i>
Summary Description	
Positive Aspects of Technique	<i>[Fill in]</i>
Negative Aspects of Technique	<i>[Fill in]</i>

Appendix C (Continued) Call Order 1 Framework for Describing Job Analysis Practices <i>Underlying Structure for Access Database</i>	
Assessment of Further Consideration	<p>[Select One and then Describe]</p> <ul style="list-style-type: none"> ▪ No. Source should not be considered, evaluated again. ▪ Maybe. Need additional information to fully describe practice but may be worth further consideration ▪ Yes. Source should be included in evaluation exercise ▪ N/A
Description of Assessment of Further Consideration	[Fill in]
Notes	[Fill in]