Appendix B: APDOT Report

The New DOT:
A Database of Occupational
Titles for the Twenty-First
Century

The New DOT:
A Database of Occupational
Titles for the Twenty-First Century

Final Report

Advisory Panel for the Dictionary of
Occupational Titles (APDOT)

U.S. Department of Labor
Robert B. Reich, Secretary
Employment and Training Administration
United States Employment Service 1993

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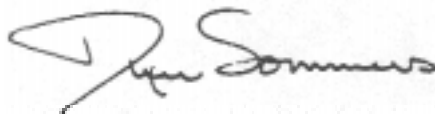
March 22, 1993

Dear Secretary Reich:

It is my privilege to transmit to you the report of the Advisory Panel for the Dictionary of Occupational Titles. The title of our report, <u>The New DOT: A Database of Occupational Titles for the Twenty-First Century,</u> suggests the forward-looking nature of our recommendations to you.

Historically, the <u>Dictionary of Occupational </u>Titles, the DOT, was developed during the economic crisis of the 1930s as a tool to help the new public employment service place workers in jobs. Over .the years, many other uses of the DOT have evolved, making it the nation's most important and widely used information resource on jobs.

The Panel believes that the DOT should be reinvented to reflect the changing nature of work in the global economy. We have recommended creating a new database system for identifying and describing the skills, knowledges and competencies needed in the changing workplace. With this new database, the Department of Labor can provide a strong foundation supporting employers and workers in the transformation to a high performance economy.

My fellow Panel members and I appreciate the opportunity-to have served the Department on this important issue. We believe you will find our report to be a strategic tool in improving the nation's workforce development efforts.

Sincerely,

Dixie Sommers Chair Advisory Panel
for the Dictionary of Occupational
Titles

CHAPTER 1: EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

"The only way America can compete and win in the twenty-first century is to have the best-educated, best-trained workforce in the world, linked together by transportation and communication networks second to none." 1

President Bill Clinton

Amanda Strong, a dedicated teacher, has brought education and business together to address pressing community problems. She has won wide support for her success in translating the skills, knowledge and abilities employers say are needed for success on the job into meaningful learning objectives for her students. Because of the new DOT, Amanda was able to move beyond generalities about the need for "a work ethic" or "problem solving skills" to a level of detail that resulted in real understanding. Now Amanda has the tools and information to make a real difference in the future of her students!

. When he left the service, Luis Rivera, a veteran with a college degree and 20 years of experience as a defense analyst, encountered many problems trying to identify and match his transferable skills with those in the private sector. Now, employed in a 'downsizing" industry, he is amazed that technology has made this task easier. With the new DOT, Luis is able to align his proficiencies with the workplace requirements of jobs in 'growth" industries to secure a successful job match.

. Jackson Graham, a labor policy analyst developing retraining programs for dislocated workers, begins his efforts by estimating the skills gap between worker capacity and workplace requirements. 7he new DOT, a national database system that replaced .cumbersome crosswalks among national data sets on job content, demographics, wages and employment trends, makes his task easier and allows him to serve more people effectively.

- Leslie Tanner, a small business owner, is convinced that she needs to restructure her business into a high, performance workplace if she is to stay competitive. Leslie wants to use a

skill-based pay system to improve productivity. She plans to pay staff 10-20 percent more if they diversify their skills. Leslie is delighted, to find the information she needs to help sales staff identify the skills involved in handling billing, production, delivery, scheduling and technical support on a sales call, in the new DOT

The experiences of these people and millions of others will result from the nation's creation of a concise, accurate and up-to-date occupational information system. A database system that identifies and describes the skills, knowledge and competencies needed to produce a high performance workplace will help millions of students, workers and employers to make informed decisions. The new Database of Occupational Titles (DOT) will help eliminate costly mistakes in their education, training, counseling and employment efforts. A renewed commitment to identify, define, describe and classify occupations, in an accessible and flexible manner, is critical to the success of future plans for workforce investment.

As early as 1996, what is now the Dictionary of Occupational Titles (DOT), the nation's single most comprehensive source of occupational information, can be transformed into a database system useful and accessible to millions. In work stations at home, in school and on the job, the new DOT can provide the infrastructure or national framework needed to support the Administration's planned investment in people and their skills. It can become a vital tool for students, parents and teachers inquiring about the world of work, for workers in transition and for employers restructuring occupations to accommodate employees with disabilities, responding to new competitive forces and designing training programs., In developing a new DOT, the United States

Dept. of Labor can give an important boost to U.S. productivity and promote the effective education, training, counseling and employment of the American workforce.

THE WORKFORCE ISSUE AND THE DOT

To succeed in the global economy of the twenty-first century, the United States must improve its productivity and competitiveness. While technology and capital investment play a role in productivity improvements, a growing consensus among national leaders suggests that the key to a more prosperous future for this country is a major investment in the skills of our people and the restructuring of our workplaces into high performance organizations.' As Secretary of Labor Robert B. Reich acknowledges, "The real economic challenge facing the United States in the years ahead ... is to increase the potential value of what its citizens can add to the global economy, by enhancing their skills and capacities and by improving their means of linking those skills and capacities to the world market."'

. The Advisory Panel for the Dictionary of Occupational Titles (APDOT), a Federal panel commissioned by the Secretary of Labor, has spent the past two years assessing the occupational information needs of the nation. The Panel has identified an essential role for the Department of Labor in. assisting industry with skills identification and workers with skills acquisition by creating a new database system. To assure that educators can prepare students to meet the challenges of the 1990s and beyond, that employers can select, train and place workers in jobs and that workers can acquire the skills needed to achieve their career goals, new types of information and linkages among occupational databases are needed.

In short, a fundamental shift in the way we think about occupational information is required. The current DOT or Dictionary of Occupational Titles was first developed in the 1930s and is best known as a book that lists some 12,000 job descriptions or definitions in a narrative, fixed format. This dictionary concept must be replaced with the new Database of Occupational Titles that provides a flexible format and offers users computer-organized data

expanded, updated and retrieved rapidly for various uses.

Data currently collected for the DOT describe the skills, knowledge, abilities and traits workers need as well as the education and training requirements, the machines, tools, equipment and materials used and the products produced. Such data descriptors are useful and their collection should continue. However, to support national efforts to revitalize the American economy, these descriptors must be supplemented with information that is necessary to revitalize the workforce.

APDOT has proposed new content for the DOT that will describe skills across a broad continuum from very general aptitudes, abilities and basic skills to occupation-specific and technical skills and knowledge. The new content is intended to help capture data on the increasingly cognitive demands of jobs and the new ways of thinking and managing that focus on quality, variety, speed and customer service - hallmarks of productivity and competitiveness in the workplace.

Moreover, today's DOT, consisting of a patchwork of information on tasks, worker traits, activities and characteristics must be integrated into a coherent system. A new database system that highlights connections between occupations, emphasizes skills transferability and links easily with related databases of education and labor market information is essential for the human resource management of the American economy. Today's students, educators, trainers, counselors and workers need information that fosters the effective integration of technology, skills and new workplace structures. The development and maintenance of a coherent database system helps fulfill Department of Labor responsibilities for facilitating the match between workers and jobs and for collecting and disseminating data on labor supply and demand as well as on economic, industrial and technological trends.

Specific differences between the current DOT and APDOT's recommendations for the future DOT are highlighted in Figure A: Comparison of the Current and Future DOT, pp. 9-10.

Advisory Panel for

APDOT CHARTER

Chartered under The Federal Advisory Committee Act, APDOT was asked to recommend to the Secretary of Labor strategies for collecting, analyzing and disseminating occupational information. The Final Report, The New DOT: A Database of Occupational Titles for the Twenty-First Century, presents the Panel's final recommendations. For a list of the recommendations presented in charter categories, see Appendix D. While the report responds to the APDOT charter, the Panel views the report primarily as a strategic management tool for the Secretary of Labor and other policy makers to use in revitalizing the DOT. Specifically, the report fulfills the Panel's mandate to mandate to:

(1) Recommend the type and scope of coverage as well as the level of detail that should be collected on occupations to produce a DOT;

(2) Advise on appropriateness of methodologies of occupational analysis used to identify, classify, define and describe jobs in the DOT;

(3) Advise on new or alternative approaches to the production, publication and dissemination of the DOT; and

(4) Recommend options for implementation of improvements to the DOT.

A NEW DOT TO SERVE MYRIAD USERS

Through its review, APDOT came to understand the myriad ways in which. the DOT is currently used and to see its critical role in increasing the productivity and quality of the workforce. Consider the following examples. Because all military service occupational classification systems are cross-coded to the DOT, it is the most powerful tool available for linking military and civilian occupations, a critical issue during current downsizing efforts. Similarly, human resource professionals in both the public and private sectors use the DOT to create or modify job classifications, to determine qualifications for selection tests, to establish skill and training requirements and to develop job training performance appraisals, career planning strategies, competency certification and job design.

Department of Labor officials traditionally use the DOT in training, retraining and placement programs especially within the Employment Service, Job Training Partnership Act, Job Corps and Bureau of Apprenticeship and Training. The Bureau of Labor Statistics uses the DOT in its development of occupational and career information. The DOT also is critical to support planned workforce investment efforts such as career centers and youth apprenticeship.

The Social Security Administration identifies the DOT as a major source of information used to determine disability benefits for some one million cases per year." Vocational rehabilitation practitioners use the DOT extensively to identify potential new occupations for persons with disabilities. The DOT is central to counseling and guidance in high school and beyond where it is used to identify transferable skills and to plan career options. For example, last year more than four million people used the state supported Career information Delivery Systems based on DOT data.' Other counseling tools that identify wage earnings and employment outlook also rely on the DOT.

The DOT is used in the nation's Foreign Labor Certifications program to identify jobs offered by employers and held by applicants in order t6 demonstrate eligibility to work in the United States. Curriculum developers in schools and training organizations use the DOT to match training objectives with descriptions of tasks and to modify curricula. Agencies involved in developing and reporting labor market information use the DOT as a core -reference. Social science researchers have also made extensive use of its data in hundreds of studies of workforce participants.,

In proposing the recommendations that follow, APDOT recognizes these uses and is committed to assuring that the revised version will be even more useful. The Panel has recommended implementation strategies that phase in dramatic changes over time and assure users of continuity while the system is restructured. At the same time, because the Department of Labor is the funding source for the DOT; APDOT believes that the Department should assign its programs as top priority. The Panel believes that in

revising the DOT to better meet its own information needs, the Department will also meet most needs of other DOT user groups.

APDOT'S RECOMMENDATIONS

Historically, the DOT was developed during the economic crisis of the 1930s as a tool to help the new public employment system improve linkages between skill supply and skill demand. The Panel believes that it is particularly appropriate for the DOT to be reinvented in the 1990s to serve the nation's current and future efforts to foster economic growth and competitiveness through skill acquisition and workforce investment.

What follows are the specific recommendations APDOT has proposed for the new DOT categorized according to the issues of purpose, database, data collection, dissemination and implementation. For a full discussion of the individual recommendations, see Chapter 2.

Purpose

1 . The purpose of the <u>Database of Occupational Titles </u>(DOT) should be to promote the effective education, training, counseling and employment of the American workforce. 7he DOT should be restructured to accomplish its purpose by providing a database system that identifies, defines, classifies and describes occupations in the economy in an- accessible and flexible manner. Moreover, the DOT should serve as a national benchmark that provides a common language for all users of occupational information.

Database

2. The scope of the DOT should cover all occupations in the United States economy.

3. The Department of Labor should use a single standardized occupational classification for the DOT and its labor market data collection programs. A single standardized classification will allow the DOT and other sources of occupational am! labor market information to be technically and conceptually compatible.

4. The level of detail used in the DOT database should be sufficiently flexible to match the recommended standardized occupational classification, while allowing for further differentiation of occupations based on user needs and on the information collected.

5. The Department of Labor should adopt the APDOT "Content Model" as a framework for identifying the occupational information included in the DOT 7he Content Model's specific descriptors or data elements should be developed as part of the implementation phase of the new DOT

6. The Department of Labor should. review every occupation detailed in the DOT at least every five years to assure that the DOT database remains current and that occupational data contained within it are updated regularly. Some -selected occupations should be reviewed more frequently.

7. As the finding source for the DOT, the Department of Labor should appropriately rank its own program needs as the top priority. In meeting. the Department's needs, APDOT also expects the occupational information included in the DOT to meet most of the needs of specialized users involved in workforce education training, counseling and employment.

Data Collection

8. The Department of Labor should use sampling techniques in the collection of data for the DOT that ensure the representativeness of occupations and the accuracy and consistency of information. 7he sampling design should make use of existing empirical information on employment by occupation and on the location and industry of employers.

9. The Department of Labor should rely on the use of structured job analysis questionnaires as the primary strategy for data collection. Alternative methods may be used to supplement data collection when warranted.

10. The Department of Labor should collect occupational information using automated technologies to fac2!ate . quality control and to

Dissemination

11. The Department of Labor should make a dynamic and flexible DOT database available in a variety of electronic, automated and hard copy formats to meet the varying needs of users involved in workforce development. 7he Department of Labor should invest in developing value-added applications as needed for its own :use and where cost-effective. 7he Department should also continue to encourage the vendor industry to develop specialized, value-added applications. Moreover, DOT data should remain available to the public at the cost of reproduction or publication.

12. The Department of Labor should develop a continuing marketing campaign to educate and inform users about the DOT database, its ,content and its use.

Implementation

13. By the year 1996, the Department - of Labor should develop a new, comprehensive, national database system that collects, produces, maintains and disseminates accurate, reliable and valid information on occupations to support the nation's workforce investment efforts. By 1994, the Department of Labor should develop a prototype database system that demonstrates the feasibility of new collection, analysis and dissemination strategies for target industries and occupations.

14. While focusing efforts on activities designed to produce a new DOT database system, the Department of Labor should maintain the existing DOT and develop interim products as appropriate.

15. The Department of Labor should commit to an ongoing research and development agenda to maintain the DOT database system's effectiveness over time.

16. The Department of Labor should assure that the staff and organization of its Occupational Analysis system reflect changes in the methods of data collection, occupational

also sustain a commitment to recruit, train and maintain a core staff of methodologically sophisticated professionals to manage the DOT program.

17. The Department of Labor should use the DOT as the foundation for related program efforts including the development of voluntary industry-based skill standards, the development of measures for assessing generic workplace skills and aptitudes and the proposed revision of the Standard Occupational Classification (SOC).

18. The Department of Labor should assure sufficient funding to develop the DOT database system. 7he Department should also make a commitment to provide additional resources for enhanced operational requirements.

In conclusion, APDOT believes that the Department of Labor should reinvent the DOT in the context of the Administration's national economic investment strategy. In supplying critical information to support the effective education, training, counseling and employment of workers, the new DOT can help America regain its competitiveness and revitalize the workplace, both now and into the twenty-first century.

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Figure A: Comparison of the Current and Future DOT

Current DOT	Future DOT
View of work reflects mechanistic, hierarchical structure of workplace.	View of work reflects restructured occupations; need for multi-skilled people.
Purpose to provide job matching for Employment Service.	Purpose to continue job matching and to support effective education, training, counseling and employment of workforce; purpose also to provide common language or benchmark for multiple users.
Scope includes all occupations but collection methods and resources limit coverage; predominance of blue-collar occupations.	Scope includes all occupations and reflects the actual composition of the labor market.
Uses classification system unique to DOT; Occupational Group Arrangement (OGA) requires complex crosswalks for linkage to other systems; uses nine-digit code for classification.	Uses a standardized occupational classification as primary classification method, facilitating direct linkage to other systems; capability for multiple classification approaches including skills.
Uses "Data-People-Things" to indicate level of complexity in jobs.	Uses new Content Model descriptors to reflect the multiple facets of job complexity.
Embeds skills information in the code, definitions and supplementary material.	Presents skills information directly in a broad continuum from very general aptitudes, abilities and basic skills to occupation-specific and technical skills and knowledge.
Patchwork of skills-related and other occupational information with both redundant and missing elements.	An integrated system that provides a common language of occupational information and a strong foundation for skills standards and assessment tools.
Content includes information on education and training requirements, machines, tools, equipment and materials used, as well as products produced.	Content redefines old descriptors and captures additional data on increasingly cognitive demands of jobs and new ways of thinking, working and managing that focus on worker attributes, work context, work content and outcomes and labor market context.
Information on skills transferability not available.	Empirically-based skills transferability information.

Current DOT	Future DOT
Limited information for understanding career paths including job families.	New organization/structure provides information on job families.
Data collected through manual, labor-intensive procedures requiring on-site observation/interview.	Data collected primarily through automated survey procedures.
Currency of data problematic because of labor intensive data collection and analysis procedures.	Currency of data facilitated through new methodology.
Sampling procedures remain problematic.	Sampling techniques increase representativeness, accuracy and consistency of data.
Primary method of dissemination is book/database with fixed format; does not allow manipulation to meet user needs.	Primary method of dissemination is flexible database; allows for easy access and manipulation to meet user needs.
Developed independently within the United States Employment Service (USES), United States Department of Labor.	Developed in coordinated fashion among offices within the Department of Labor and outside users to support related skills and assessment initiatives, the collection of labor market information and the effective education, training, counseling and employment of the workforce.

CHAPTER 2: APDOT RECOMMENDATIONS

APDOT RECOMMENDATIONS

In presenting its recommendations, APDOT recognizes the needs of millions of current DOT users and is committed to assuring that the revised version will be even more useful to them. APDOT's recommendations for reinventing the DOT are based on the fundamental proposition that the DOT's current purpose should be expanded to serve the national goal of creating "the best-educated and best-trained workforce in the world."

Specific recommendations regarding form and function follow purpose. APDOT's avowed purpose for the DOT transcends its historic function of supporting Employment Service job matching activities. Not only can the new DOT improve the labor exchange efforts of the Employment Service and other placement agencies, it can also better serve employers, educators, trainers and counselors in their efforts to prepare the future workforce, to restructure the workplace, to improve the quality of education and training and to identify potential career paths of worker.

APDOT has worked to assure that its recommendations are practical and cost effective. The Panel has sought to produce recommendations that can and will be implemented. The Panel has recommended implementation strategies that phase in dramatic changes over time and assure users of continuity while the system is restructured. APDOT believes that the Department of Labor today has an historic opportunity to help forge the future. By creating a new database system that collects, publishes and maintains reliable and valid occupational information, the Department can help lead the nation's workforce revitalization efforts into the twenty-first century.

Purpose

1. *The purpose of the Database of Occupational Titles (DOT) should be to promote the effective education, training, counseling and employment of the American workforce. The DOT should be restructured to accomplish its purpose by providing a database system that identifies, defines, classifies and describes occupations in the economy in an*

accessible and flexible manner. Moreover, the DOT should serve as a national benchmark that provides a common language for all users of occupational information.

APDOT recommends that the Department of Labor begin its revision of the Dictionary of Occupational Titles (DOT) by articulating a purpose that underscores the national goal of creating the best-educated and best-trained workforce in the world. While significant changes are required to transform the DOT into an effective tool for the twenty-first century, in identifying, defining, classifying and describing the nation's occupations, the DOT can provide the infrastructure or national framework needed to support the Administration's planned investment in people and their skills. The DOT is the nation's most comprehensive source of information on occupations and skills. By implementing the series of recommendations APDOT has proposed, the new DOT can continue to support past uses as well as career centers and youth apprenticeship.[1]

The DOT was originally developed in the 1930s to help the new public Employment Service match skill supply with skill demand. It was a time when mass production largely controlled or limited worker discretion. Jobs were broken into simple tasks that could be filled by low-skilled workers. Layers of managers directed efforts while sophisticated quality control systems caught defects.[2] In describing workers and workplaces, the DOT of the past reflected centralized hierarchical structures and thousands of narrowly defined jobs. As a result, it frequently emphasized manual and manipulative rather than cognitive skill requirements.

Today intense international competition is changing the workplace. The new workplace is characterized by fast-paced product cycles, rapid changes in technology and increased interest in quality and service. To meet these changes, new business arrangements have evolved that encourage faster and more creative action, increased flexibility and closer partnerships with employees and customers.[3] Competition has also increased the pressure for performance.

More flexible and adaptable workforces value teamwork over individual effort and networks and alliances over rigid hierarchies. Flatter organizations decentralize responsibility and create greater employee involvement at all levels. In short, these new high performance workplaces demand new technologies, new workplace structures and new skills.

APDOT believes that the new DOT must reflect these changes. To be useful to educators, employers, trainers and counselors in the future, the DOT database must capture new information on workers and workplaces. It must also allow users greater access to and flexibility in manipulating this information. By providing accurate, current and timely information on skills and related data, the new DOT database can serve business, education and government in their efforts to fully develop human resources.

Developing the DOT database as a national benchmark will help standardize terminology for consistent use across sectors. Today there are few standard definitions in the study of skills and work. If major consumers and producers of occupational information can agree on a common language for identifying and defining worker attributes, work content and outcomes and performance standards, efforts to bridge the gap between workforce skills and workplace requirements will be greatly enhanced. The DOT can provide comprehensive information about work and workers in a common language useful to students, educators, employers and workers. In serving to improve communication among these groups, the DOT will help integrate learning, training and work in ways not currently possible.

Database Content

2.   *The scope of the DOT should cover all occupations in the United States economy*.

To fulfill its purpose and serve as a coherent national database system for identifying and describing the skills, knowledge and competencies needed to produce a competitive workforce, the DOT should describe all occupations in the United States economy. Limiting the coverage of the future DOT to occupations in high employment or high growth

industries or to new and emerging occupations, as has been proposed by some users, would limit the DOT's usefulness as a tool for human resource management of the American economy. The DOT is a useful resource for those who remain employed in traditional and/or declining industries as well as for those who continue to need comprehensive information on work and workers across all industries.

APDOT believes that the future DOT should cover all occupations in the national economy while reflecting the actual composition of the labor market. The new DOT should mirror the changing workplace by illustrating the collapsing, merging and restructuring of occupations. As a result of this guidance, APDOT anticipates that the scope of the future DOT will cover, the national economy while describing significantly fewer than the 12,000 occupations currently detailed.

APDOT believes that comprehensive coverage of occupations will help the DOT serve as a vital tool for students, parents and teachers inquiring about the world of work, for workers in transition and for employers restructuring occupations to accommodate employees with disabilities, responding to competitive forces and designing training programs. Comprehensive coverage will also allow the DOT to help students, educators, employers and workers to compare workforce proficiencies with workplace requirements. Coupled with assessments on students and workers, comprehensive coverage in the new DOT database system will also help policy makers more accurately estimate future skills requirements.

3.   *The Department of Labor should use a single standardized occupational classification for the DOT and its labor market data collection programs. A single standardized classification will allow the DOT and other sources of occupational and labor market information to be technically and conceptually compatible.*

One of the APDOT's principal charges is to advise the Secretary of Labor on the most appropriate classification system for the DOT. The classification system provides the structure that allows for standardizing, sorting,

organizing, locating and analyzing data. After a review of other systems used in the U.S. and internationally, APDOT recommends that the Department of Labor designate a single classification system to be used throughout the Department for developing the DOT database, reporting labor market data, designing and evaluating training programs and assisting in job placement.

This single classification system cannot be a simple revision of the current DOT structure, but should be a system representing today's world of work. The APDOT recognizes that the Standard Occupational Classification (SOC) was originally developed to provide a single standard classification. The SOC, developed and maintained by the Office of Management and Budget, has not fully served this purpose. It is now out of date and has required adaptation when used for data collection purposes.

The Bureau of Labor Statistics is assisting the Office of Management and Budget in the upcoming revision of the SOC. The Department of Labor should consider the revision of the SOC as an opportunity to develop the standardized classification' system recommended for use throughout the Department. (The SOC revision is discussed further in Recommendation 17.)

APDOT believes that standardization of classification systems across all major sources of occupational information, including the DOT, will lead to one system in which both occupational (job content) information and labor market (wages, supply and demand) information are technically and conceptually compatible. Although efforts have been made to provide crosswalks, the nation's classification systems remain incompatible in significant ways.[4] Standardization allows accurate integration of existing and new data, facilitating the linkage of training programs, job placement activities and the labor market. Integration of such information will improve the DOT's usefulness in matching people with jobs, including identifying transferable skills among dislocated workers and those impacted by downsizing the Military, as well as the work of the public Employment Service.

A standardized classification structure will also improve the DOT's linkages with other programs devoted to skills. In these cases, measures will need to be developed to link skills assessment in schools and employment and training agencies with the DOT. The National Assessment of Educational Progress (NAEP), the Department of Labor Workplace Literacy Assessment and the General Aptitude Test Battery (GATB) assessment programs represent some programs that may serve the needs of educators, employers and others interested in workforce development.

Finally, it is important to realize that using a standardized classification for the new DOT will assist those interested in the counting functions and occupation information data development without harming those that would prefer a skills-based system for classifying occupational data. An automated DOT database is no longer tied to one rigid classification methodology. It allows for presentation and manipulation of the data in whatever manner is desired by the user, thereby serving a broader range of user needs. The potential for multiple ways to classify the data is extremely important, as this multiple approach can increase users' capacities to identify transferable skills. Other classification bases might include, but are not limited to, physical demands, skills, interests, industries, education levels or the current "MPSMS" (materials, products, subject matter and services).

Until the SOC revision is completed or an alternative classification is developed, the Department of Labor will need to adopt interim measures regarding the DOT's classification structure. APDOT suggests that the Department consider using the Occupational Employment Statistics (OES) classification system, developed by the Bureau of Labor Statistics for collecting employment data. As an interim classification, the OES will allow the Department to take advantage of empirical data on employment patterns for sample design for the new DOT and to relate the information in the DOT to other occupational data sources linked with the OES. (Sampling design is discussed further under Recommendation 8.)

4. *The level of detail used in the DOT database should be sufficiently flexible to match*

the Dictionary of Occupational Titles_____15

the recommended standardized occupational classification, while allowing for further differentiation of occupations based on user needs and on the information collected.

APDOT recognizes that information at the most detailed level provided by a standardized classification system will not be sufficient to meet the needs of many DOT users. Therefore, the DOT should be flexible in the level of detail it provides, providing additional subcategories where appropriate. The level of occupational detail should be governed by the empirical information on how much distinction actually exists within broader job categories represented by the standardized classification and by policy questions regarding. the importance of the distinct categories to particular users.

Depending on the needs of users, the future DOT could provide different levels of detail for different types of jobs. Options include detailing high-skill occupations more than low-skill occupations or limiting detailed description to selected occupations. For example, users engaged in training and development activities may require more detail for occupations with recent changes in task and skill requirements, with modifications in the complexity of tasks performed and with variations in the extent of education and training required. Certain economic and labor market trends, such as anticipated high levels of employment growth and anticipated labor shortages, also suggest the need for detailed occupations when employment/placement is the goal. The criteria for these selected occupations should be determined by the Department with the support of technical experts.

5. *The Department of Labor should adopt the APDOT "Content Model" as a framework for identifying the occupational information included in the DOT. The Content Model's specific descriptors or data elements should be developed as part of the implementation phase of the new DOT.*

To accommodate the demands of the broad spectrum of DOT users involved in educating, training, counseling and employing workers, APDOT recommends the adoption of a new DOT "Content Model." (See Appendix A for a

detailed discussion of the Content Model.) This Content Model has been drawn from a thorough analysis of user survey results, public comments and a wide-ranging review of research in such areas as job and skill analysis, human individual differences and organization analysis. It embodies a broad view of occupational analysis that reflects the characteristics both of occupations (through the use of job-oriented descriptors) and of people (through the use of worker-oriented descriptors). The Content Model provides a coherent, integrated system of comprehensive information about work and workers that APDOT believes should be considered for inclusion in a revised DOT, as well as in related or supplementary documents such as the Guide for Occupational Exploration.

The APDOT Content Model is organized into four sections that represent the major elements of a systems model of work: **Worker Attributes** (Section I) reflecting input variables; **Work Context** (Section 11) reflecting throughput or process variables which are further divided into Organizational Context and Work/Job Context; **Work Content and Outcomes** (Section III) reflecting output variables and **Labor Market Context** (Section IV) reflecting the broader economic system of which all jobs are a part. Each section defines, provides examples of and in some cases lists more specific elements of individual descriptor categories.

The **Worker Attributes** section includes descriptors related to the characteristics or qualifications that a worker brings to the job, such as aptitudes, basic workplace skills and personal qualities. The **Work Context** section includes descriptors related to the broader organizational system in which the work is performed as well as the more immediate job context. Descriptors include: organizational structure, terms and conditions of employment, physical working conditions and performance standards.

The **Work Content and Outcomes** section includes descriptors related to the of content of the work carried out by the worker and the outcomes resulting from the work, such as generalized work activities, duties/tasks performed, services rendered and/or products

produced. **The Labor Market Context** section includes descriptors related to the broader economic and labor market setting in which jobs are performed, as well as information regarding how these factors affect jobs. These include labor market trends, economic trends and occupational outlook.

Although the proposed Content Model is detailed in Appendix A of this Final Report, the model does not define all aspects or specific elements of every descriptor category listed. This is viewed by APDOT as a matter for more intensive and focused research, analysis and implementation-related decisions. Research efforts should focus on among other things, validation of the suggested skills-related information hierarchy (the first five Worker Attributes descriptor categories) and the feasibility of constructing standardized taxonomies of occupation-specific skills and occupation-specific knowledge. A series of research papers commissioned for the APDOT to examine some of the issues related to the Content Model are listed in Appendix E. **However, in principle, APDOT does not support the inclusion of any descriptors or elements on which sufficiently reliable, valid and generalizable data cannot be obtained, unless their inclusion is intended to obtain the data necessary to examine such questions.**

6. *The Department* **of** *Labor of should review every occupation detailed in the DOT at least every five years to assure that the DOT database remains current and that occupational data contained within it are updated regularly. Some selected occupations should be reviewed more frequently.*

Perhaps the most consistent criticism of the DOT has been its lack of currency. The fourth edition was published in 1977. While a small supplement was offered in 1986, the DOT was not revised again until 1991. However, even this revision was not as extensive as required since most occupations were not updated.

The timely updating of skills and related information remains a critical issue if the DOT is to serve as a useful tool in workforce education, training, counseling and employment. The Department of Labor will need to balance

user needs for currency with practical considerations of cost-effectiveness and budgeting restraints. However, maintaining current information is a key to economic competitiveness. APDOT believes that the ability of the Department to achieve currency in future editions of the DOT will depend upon: (1) increased automation, (2) alternative job analysis methodologies, (3) new classification structures, and (4) adequate funding. Each of these factors is discussed in some detail in other recommendations. (See Recommendations 10, 9, 3, and 18.)

To update DOT data, the Department should combine periodic reviews of occupations, consultation with subject matter experts and a mechanism that links the DOT database to other systems and databases, in mutually beneficial relationships. Employer groups, unions and associations should be consulted, along with data from the Bureau of Labor Statistics, to identify and gather information on all occupations at least once every five years. Some selected occupations may need to be reviewed more frequently as determined by the Department. These may include new and emerging occupations as well as those experiencing significant and/or frequent changes in task and skill requirements, complexity of tasks performed, extent of education and training required, high levels of employment growth and anticipated labor shortages.

If the Department implements APDOT's recommendation of to move to a single classification system, the DOT data collection could be tied to the same three year data collection cycle used by the Bureau of Labor Statistics in the Occupational Employment Statistics program. The counting and reporting functions carried out by the Bureau of Labor Statistics and the descriptive functions carried out by the Employment and Training Administration would remain separate and distinct. However, the timely updating of both would allow users to stay in touch with changes emerging in the workplace.

7. *As the funding source, the DOT, the Department of Labor should appropriately rank its own program needs as the top priority. In meeting the Department's needs, APDOT also*

expects the occupational information included in the DOT to meet most of the needs of specialized users involved in workforce education, training, counseling and employment.

The DOT is a multi-faceted tool with broad human resource applications. Because the Department of Labor is the funding source, APDOT believes that the Department should assign serving its own programs as top priority for revising the DOT. Employment and Training Administration programs such as the Employment Service, the Job Training Partnership Act, the Bureau of Apprenticeship and Training and the Office of Work-Based Learning efforts regarding voluntary industry-based skill standards and youth apprenticeship are critical to providing the nation with a better trained workforce. Equally important to guiding the nation's economic strategy are the key data collection and reporting programs of the Bureau of Labor Statistics such as the Occupational Employment Statistics program and the development of the Occupational Outlook Handbook. Programs of the National Occupational Information Coordinating Committee should be considered essential as well.

After reviewing the major uses and users of the DOT, the Panel believes that in revising the DOT to better meet its own information needs, the Department will also meet most of the needs of other DOT user groups.[5] Those who use the DOT for career and vocational counseling, disability determination, vocational rehabilitation, curriculum development, foreign labor certification, employment placement, labor market information, human resource development and management, occupational information development and dissemination and research largely require the data descriptors for work, the worker and the workplace that APDOT has recommended in the new DOT Content Model.

In providing comprehensive, accurate and current skills and related information, the DOT will accommodate the information needs of current users. In addition, by clustering occupations into job families, the new DOT will facilitate the identification of transferable skills

and improve job matching capabilities. By linking more easily with related classification systems and databases, the new DOT will help users consider data on wages, demographics, job vacancies and job surpluses at the same time they review data on job descriptions, skills and knowledge assessments and national industry-based skill standards.

While APDOT is enthusiastic about the potential of the new DOT to foster the best-educated and best-trained workforce in the world, the Panel believes that the Department of Labor should use a formal disclaimer to express the limitations of DOT data as well. Some longstanding concerns regarding the validity of DOT data result from the uses to which the data are put.[6] For example, within the vocational rehabilitation and forensic communities, the DOT frequently is introduced into courts as evidence and DOT data are used in medical settings to determine the physical demands of jobs. APDOT believes that such uses may be questionable, since the DOT offers composite occupational descriptions and not organization-specific job descriptions.

Additionally, some users and user groups have suggested that the new DOT be used to help operationalize the Americans with Disabilities Act (ADA). These users believe that the DOT provides information on the "essential functions" of jobs. "Essential functions," according to ADA, are the functions that an individual who holds the job must be able to perform unaided or with the assistance of reasonable accommodation.[7] Through its recommendations regarding the proposed Content Model for the DOT, as well as its emphasis on skills, APDOT supports the goals of ADA. The Panel believes that the new DOT will be helpful to both employers and workers in understanding the dimensions of a job. The new DOT will describe the characteristics of occupations so that any person can evaluate capability to perform an occupation.

It must be emphasized, however, that both the present and future DOT provide information on composite occupations and not specific jobs of particular employers. According to ADA, whether a particular function is essential is a factual determination that must be made on a

case by case basis. This determination is the sole right and responsibility, by law, of the employer. Thus APDOT believes that the use of the DOT to determine essential functions under ADA is inappropriate. APDOT believes that the Department of Labor will want to investigate the issue and offer its own legal opinions.

Data Collection Methodology

8. *The Department of Labor should use sampling techniques in the collection of data for the DOT that ensure the representativeness of occupations and the accuracy and consistency of information. The sampling design should make use of existing empirical information on employment by occupation and on the location and industry of employers*.

It is important that the DOT accurately reflect the occupational composition of the U.S. economy. APDOT agrees with a common criticism of the existing DOT that it is not representative. The DOT contains much more detail on occupations in manufacturing than in other sectors and contains many very specific occupations which probably have very few workers. Most important, because no data exist on employment by DOT occupation, how well the DOT represents the economy cannot be examined directly.

APDOT has recommended that the Department develop a single standardized occupational classification system for use in the DOT and its labor market data collection programs. (See Recommendation 3.) Until this new classification system is in place, APDOT recommends that the Department develop a sampling design for the DOT which draws on the Occupational Employment Statistics (OES) survey as a universe of occupations in the nonfarm payroll sector of the economy. The OES data indicate the distribution of jobs by occupation, with further detail by industry, state and size of employing establishment. A sampling design for the DOT should use this information to develop a random sample of establishments from which to collect occupational data, using the Bureau of Labor Statistics establishment files (the ES-202) as the universe of establishments. For sectors not

covered by the OES program, a supplemental sampling design must be developed.

Data collection should include gathering information on the characteristics of the occupation at the most detailed level in a standardized occupational classification system and provide for defining occupations below that level. It may be possible to gather data on the distribution of jobs across occupations below the standardized occupational classification system's most detailed level, providing DOT users with information on the relative importance of the occupation in terms of employment.

In addition to requiring a representative database, DOT users also need to know how occupations are changing. The Department should include in its sampling design procedures for identifying occupations in which rapid change is occurring. It should develop special studies using supplemental samples to gather information on these occupations. More generally, the Department should implement a survey schedule which provides for data collection on specific occupational areas at regular intervals, so trends in occupational information can be identified. (See Recommendation 6.)

9. *The Department of Labor should rely on the use of structured job analysis questionnaires as the primary strategy for data collection. Alternative methods may be used to supplement data collection when warranted*.

The needs of users involved in workforce education, training, counseling and employment must be the driving force behind the design and development of new data collection methodologies. Put simply, the DOT must collect, analyze and disseminate the data that people need. APDOT has proposed a new DOT Content Model to organize occupational data. (See Recommendation 5 and Appendix A of this Final Report.) The information in each data category of the Content Model must be collectable using a measurement tool or instrument. To ensure the efficient and cost-effective collection of high-quality, current and accurate data, APDOT recognizes that the DOT's current job analysis/data collection methodology must change.

The collection of occupational information for the DOT has, from its inception in the 1930s, been performed by trained occupational analysts in a network of occupational analysis field centers. These experts compile data primarily through the use of observation/interview techniques, a methodology of data collection that generally results in accurate occupational information but at great expense of time and cost. Quite simply, it is a cost-prohibitive method for any realistic effort to describe all occupations in the American economy. In the course of reviewing the DOT, APDOT studied numerous job analysis systems and concluded that high-quality results are achievable with the use of structured questionnaires and properly conducted surveys.[8] The use of structured questionnaires and survey methods offers the Department the opportunity to collect more data, more quickly thus improving currency. These alternative methodologies also appear to be cost effective.

After studying alternative job analysis methods and consulting with technical experts as well as the developers of well-respected systems, APDOT concluded that no single system currently exists that will accommodate all of the demands of a future DOT.[9] The Department of Labor will ultimately need to develop a comprehensive occupational analysis system to replace the current data collection procedures detailed in The Revised Handbook for Analyzing Jobs.[10] To be credible with users of the data, the system must be empirically derived and provide solid technical documentation.

APDOT does not believe that the new occupational analysis methodology and instruments must all be fully developed before the Department can move forward with a significant data collection effort. Rather, APDOT believes that it may be possible to begin the process by using currently available methods or instruments with perhaps some minor adaptations. Some current systems may be available to the Department without cost. In other cases, the Department can negotiate cost with the developers. This approach will prevent the unnecessary expenditure of funds and assure that the nation has the data needed to move forward in workforce training, education, counseling and employment.

To maximize resources, APDOT believes the Department should also investigate the feasibility of incorporating job analysis data collected by other organizations, such as the Office of Personnel Management, the Department of Defense and appropriate private-sector organizations, into the DOT database. This supports President Clinton's suggestions regarding a national defense-jobs inventory to assist displaced workers.[11] All data accepted for inclusion in the DOT from outside sources would meet the standards of validity and reliability established by the Department of Labor.

Finally, APDOT wishes to emphasize that not all information used in the new DOT will be collected through job analysis processes. Some information may be more appropriately determined through other forms of research or data collection. These may include for example, the development of worker aptitude/ability patterns through aptitude test validation studies and linkages with other databases and information sources for the development of occupational outlook information, labor market trends and occupational demographics.

10. *The Department of Labor should collect occupational information using automated technologies to facilitate quality control and to achieve currency and accuracy in a cost-effective manner*.

Current industry research and data collection activities for the DOT are manual processes with automation limited to creating, managing, storing and retrieving job analysis and occupational definition documents. Data are manually collected on-site using the observational/interview technique by trained occupational analysts located in five field offices. The current database is housed in the North Carolina Field Center office. It has limited accessibility, uses very limited technology and has no linkages to external databases. Moreover, the occupational analysts who collect information for the current DOT have no direct access to the database during the course of industry planning, data collection, analysis, evaluation and coordination of work activities.

APDOT believes that extensive use of computer technology is mandatory if the Department of Labor is to transform the DOT into a multipurpose tool for the education, training, counseling and employment of the workforce of the future. The Department can choose from a broad array of technology to implement an automated data collection process. The results will improve the currency and accuracy of DOT data. Automation can also ensure quality control of DOT occupational information as well as provide a cost-effective process for collecting it.

In a paper commissioned by APDOT on potential automation strategies, experts have identified the following: technologies, currently or soon to be available, that have the potential to greatly alter the process of DOT data collection: hand-held computers, pen computers, bar coding, optical character recognition, handwriting recognition, speech recognition, electronic gateways providing access to other databases, relational databases and distributed systems and the use of geographic information systems to dramatically improve the systematic sampling techniques used in DOT data collection.[12]

Because of the range of options available to the Department of Labor in automating the DOT, APDOT recommends that the Department begin by developing a plan for automating the system consistent with the Content Model and recommended job analysis approaches. (See Recommendations 5 and 9.) For example, the use of survey methodology for job analysis/data collection can be accommodated by the existing computer technology of machine readable questionnaire forms. Moreover, observation/interview techniques of job analysis, which will be needed to develop and validate surveys, can be improved by computer technology such as scanable answer sheets for the job analysis reports, electronic keypads and laptop computers. The Department will need to select those computer technologies most appropriate to fulfilling its goal of a cost-effective, coherent national database system.

Dissemination

11. *The Department of Labor should make a dynamic and flexible DOT database available in a variety of electronic, automated and hard copy formats to meet the varying needs of users involved in workforce development. The Department of Labor should invest in developing value-added applications as needed for its own use and where cost-effective. The Department should also continue to encourage the vendor industry to develop specialized, value-added applications. Moreover, DOT data should remain available to the public at the cost of reproduction or publication*.

While the DOT is currently available on data tapes and floppy disks, it has traditionally been primarily a hard copy medium. Both technical experts commissioned by APDOT and DOT users have suggested that at automated dissemination of the database will increase its utility as an effective tool for workforce education, training, counseling and employment.[13] In their responses to surveys and Federal Register notices, DOT users emphasized the desirability of a user-friendly, highly accessible, automated database. Users cited floppy disks, on-line information, electronic bulletin boards, CD-ROM, interactive laser disks and mainframe and PC versions as potential dissemination media. Users also requested that the DOT remain available in hard copy. Expressing concern that some educators, schools, libraries and others may not have access to computerized equipment, they suggested that hard copy versions of the DOT will be needed for the foreseeable future.

APDOT believes that the Department of Labor should develop an automated DOT version available on current and future media such as tape, disk and/or CD-ROM. This new database system should allow users to access and manipulate the data. It should be a relational database rather than a flat file or text file. In addition, the DOT database system should be sufficiently flexible and accessible to facilitate creation of small-scale, customized, hard copy versions. Subscription services and electronic bulletin board technologies may be further explored as a way of making the DOT or DOT-related products such as the Guide for

the Dictionary of Occupational Titles_____21

Occupational Exploration (GOE) available to users.

The extent of Department involvement in the provision of advanced DOT applications is of major concern to scores of developers and vendors who have built a substantial industry around the provision of value-added products based on the DOT. Numerous private vendors have taken the core DOT, added value to it, and successfully marketed these products. APDOT believes that the Department should encourage the developer and vendor industry to make available the widest possible variety of value added applications, utilizing information provided by the DOT database.

A paper commissioned by APDOT to review the nature and extent of commercial products that utilize data from the DOT identified more than 100 products.[14] These public and private hard copy products and software programs vary widely in the amount and kind of data they make available, in their levels of sophistication of accessing strategies, in their applications, equipment (hardware and software) requirements and in their cost. Applications by vendors range from simple reprints of the DOT to automated versions of the database on disk or tape. There are also computerized accessing strategies tailored to meet specific needs. Some products supplement the DOT by including assessment instruments that are keyed to DOT worker trait items, by providing instructional information, or by facilitating career exploration, disability determination or some other special application. Some products add information from other classification systems and databases, such as Standard Occupational Classification and Occupational Employment Statistics codes, census data, wage data and interest data, in specific combinations for specific uses.

APDOT recommends that the Department of Labor develop the DOT as a flexible, automated, database that remains available for public use at the cost of reproduction or publication. Basic hard copy versions of the DOT and related products should be produced. In addition, the Department should invest in applications development when such materials are cost-effective and needed for its own use. However, APDOT believes the Department

should not seek to compete with entrepreneurs in customizing the DOT information needed for the market place.

12. *The Department of Labor should develop a continuing marketing campaign to educate and inform users about the DOT database, its content and its use.*

To maximize the DOT's usefulness as a national database for identifying and describing the skills, knowledge and competencies needed to educate, train, counsel and employ the workforce, the Department of Labor must broaden users' awareness and understanding of the DOT and its content. The Department must assure that the DOT is appropriately marketed and that its users have adequate informational and educational programs supporting it.

Historically, the marketing of the DOT and related products, such as the Selected Characteristics of Occupations Defined in the DOT and the Guide for Occupational Exploration, has been accomplished through the Government Printing Office (GPO) with announcements of updates distributed as part of the GPO's efforts for all publications. While the DOT is a GPO best seller, with more than 350,000 hard copies sold, many users remain unaware of DOT-related products or the DOT data tape. When the DOT Fourth Edition, Revised was published in September 1991, many users remained unaware of its existence for months.

APDOT believes that the Department should develop an effective marketing strategy to inform the user community about the DOT. In addition to printed documents and other hard copy materials, this marketing campaign may include the development of demonstration video tapes or computer diskettes targeted at specific user groups to illustrate its potential uses. Materials should explain the benefits of DOT use such as its comprehensiveness and flexibility, linkages to other databases and systems, as well as the currency and accuracy of the data contained within it.

Many DOT users have expressed a need for training and assistance in correctly using the current DOT, noting the value of "help" menus,

user manuals and instructional programs. Although explanatory information has been provided in the past, it has not been sufficiently user-friendly to accommodate a document/database as complex as the DOT. APDOT believes that DOT information should be presented in an easily understood format with a minimum of technical jargon. Technical assistance in the form of easily referenced hard copy and automated desk aids and training manuals, as well as instructional programs and videos, should be available to users.

As the Department of Labor institutes major changes to the DOT database, the need for an aggressive and continuing educational and informational campaign becomes acute, both to illustrate the scope and range of information that will be available to DOT users and to assure appropriate use of this information. A significant technical assistance effort will be needed nationwide to facilitate a managed transition to a new DOT. Appropriate education and training materials will be the key to its success. In addition, toll-free help lines and the formation of user groups may be explored to assist in the transition.

Implementation

13*. By the year 1996, the Department of Labor should develop a new, comprehensive, national database system that collects, produces, maintains and disseminates accurate, reliable and valid information on occupations to support the nation's workforce investment efforts. By 1994, the Department of Labor should develop a prototype database system that demonstrates the feasibility of new collection, analysis and dissemination strategies for target industries and occupations*.

APDOT believes that its vision of the DOT as an effective tool for identifying and describing the skills, knowledge and competencies needed to produce a high performance workforce is achievable by the year 1996. In supplying critical data to support the effective education, training, counseling and employment of workers, the new DOT can help America regain its competitiveness and revitalize the workplace. The Panel has recommended implementation strategies that phase in dramatic changes over

time and assure users of continuity while the system is restructured.

The Panel acknowledges that, while continuity is needed, some of the current uses of the DOT will need to change. For example, if the Department implements Recommendation 3 concerning classification, it is likely that the current nine-digit code will be replaced by a different coding scheme. Users will therefore need to change their systems which are based on the nine-digit code. In other cases, the DOT will continue to be used to meet an agency's purposes, but particular regulations that specify how the DOT should be used will need to be revised.

Summarizing APDOT's recommendations, the goal is to produce a coherent database system that:

- meets the needs of the Department of Labor and a broad spectrum of users
- embodies a common language and serves as a national benchmark for occupational information
- captures new content data that reflect hallmarks of productivity and competitiveness in the workplace
- covers all occupations in the national economy
- links easily with related databases
- creates a new Content Model for systematically capturing skills-related information of multiple types, at multiple levels of detail
- achieves accuracy, currency and timeliness in data coverage
- relies on structured surveys conducted for data collection
- improves productivity through applications of computer technology
- uses a single, standardized occupational classification system as its primary classification structure
- disseminates data through multiple media and flexible formats
- incorporates a restructured occupational analysis system
- provides effective training and technical assistance to users

While this revitalization of the DOT represents a considerable effort, APDOT

believes that its accomplishment is well within the scope of Department action. Between 1993 and 1996, the Department will need to undertake extensive activities, including making the Content Model operational by researching and validating new skills domains; developing and testing new survey data collection methodologies; revising the classification structure and sampling methodologies; validating and updating the current DOT database and linking with other classification structures and databases on national standards, job descriptions, skills assessment and labor market information.

APDOT supports the use of technical advisors to assist the Department in finalizing decisions regarding specific data to be included as well as collection and analysis methods to be used. The Department should begin its implementation of recommendations by developing a plan for making the new Content Model operational. This plan should include a definition of the data descriptors to be included, a rationale for inclusion, possible measurement options, issues or problems raised and recommendations. As a result of this plan, Department staff will be able to move forward with data collection and analysis efforts. APDOT believes that it will be vital for the Department of Labor to demonstrate the capabilities of the new database system as quickly as possible.

To build support among users for the development and maintenance of a new system, the Department should implement a prototype DOT by 1994. By developing a prototype that selects targeted industries and occupations (high performance, high technology, new and emerging), the Department of Labor can test new approaches to collection, analysis and dissemination and demonstrate the feasibility of the new system.

The prototype DOT should demonstrate the systems' capability to accomplish the following types of activities of benefit to educators, trainers, counselors and employers:

- create job profiles
- develop tailored occupational descriptions
- link to other databases

- include new content descriptors on skills and related issues
- identify new and emerging occupations

The Department should outline specifications for the prototype as quickly as possible. Once the desired "outputs" are defined, Department staff, with the support of technical experts, will be able to define the steps, resources and procedures needed to accomplish the goal. While advice on appropriate hardware and software should be sought from technical experts, the entire process must be informed by the needs of users who should be consulted on a regular basis through focus groups and meetings with industry representatives. Moreover, Department of Labor decisions regarding the Content Model must be included in plans for the prototype to assure that the prototype will be as complete as possible by 1994.

14. *While focusing efforts on activities designed to produce a new DOT database system, the Department of Labor should maintain the existing DOT and develop interim products as appropriate.*

The value of the DOT has been confirmed in its use by hundreds of thousands of human resource professionals. Indeed in several surveys dating back to 1980, significant numbers of users expressed concerns that they would have difficulty performing their jobs without the DOT.[15] While the Department of Labor works toward development of a coherent national database system (1996) and demonstrates the feasibility of new methods to collect, analyze and disseminate data in a prototype (1994), it must continue to make DOT data available to the user community. In a process of managed transition, the Department should immediately begin making adjustments to the DOT and the system that produces it.

During the development phase for the new DOT, maintenance activities should be viewed as a lesser priority for the Department. Appropriate activities may consist of reformatting the current DOT classification structure into a relational database format for the future version. Staff can also begin the process of collapsing occupations based on existing information. Coordinated efforts with the

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Bureau of Labor Statistics to identify new and emerging occupations and with the Office of Work-Based Learning to identify voluntary skill standards should also continue as interim steps in the development of a new DOT. (See Recommendation 17 for a discussion of coordination activities.)

15. *The Department of Labor should commit to an ongoing research and development agenda to maintain the DOT database system's effectiveness over time.*

APDOT recognizes that as the current DOT evolves into a new database system, it should be supported by an ongoing research agenda. As suggested in Recommendation 5 and Appendix A on the Content Model and Recommendation 9 on data collection methods, expert technical assistance will be needed to make final decisions regarding the inclusion of appropriate descriptor categories and specific elements for worker attributes, work context, work content and outcomes and labor market context. Use of a single standardized classification system for classification and sampling purposes may also require outside technical support and planning. (See Recommendations 3 and 8.) Moreover, rapid advances in automation technologies require continual monitoring to ensure appropriate use in the development, production and dissemination of the new DOT. (See Recommendations 10 and 11.)

APDOT supports funding for research and development activities to assure that the new DOT database system becomes fully operational and maintains its effectiveness over time. Ongoing research and development activities will help the DOT system adjust to change and identify new strategies for maintaining currency and accuracy in the future. Research and development will also preserve the DOT in the forefront of occupational information. Research has already begun on key technical issues identified in the recommendations cited above. A list of papers and reports developed for APDOT is included in Appendix E of this report.

16. *The Department of Labor should assure that the staff and organization of its Occupational Analysis system reflect changes in*

the methods of data collection, occupational analysis and information dissemination required by the new DOT system. The Department should also sustain a commitment to recruit, train and maintain a core staff of methodologically sophisticated professionals to manage the DOT program.

APDOT believes that the transformation of the DOT into a new database system that furthers the national goal of creating the best-educated and best-trained workforce in the world will require fundamental changes in the structure and staffing of the Occupational Analysis system. Since its inception, data for the Dictionary of Occupational Titles have been produced by the Occupational Analysis system, an organization whose current structure includes a network of field centers. Oversight, technical direction, and support for the system is the responsibility of the U.S. Employment Service. This agency, headquartered in the U.S. Department of Labor in Washington, D.C., is also responsible for the final production of the DOT document.

Over the years, the field center network has consisted of a changing mix of locations and personnel. It currently includes five offices (situated in North Carolina, Massachusetts, Michigan, Missouri, and Utah) employing approximately 30 occupational analysts with an annual budget of $2.3 million. North Carolina has had lead responsibility for collecting, developing and-analyzing the data used in the DOT.

To be successful in future efforts, APDOT believes that the Department needs a new organization supporting a new system. The transformation of the current DOT into a new database system requires a concomitant restructuring of the occupational analysis staff and organization to reflect changes in the methods of data collection, occupational analysis and information dissemination. The Department will need to model the actions of a high performance work organization and focus on its customers. It must simultaneously upgrade the skills of the analysts, make effective use of technology and automation and restructure workplace processes used to collect, analyze, produce and disseminate a new DOT.

Occupational analysts for the new DOT will need to be trained in the use of structured questionnaires and survey methodology for data collection. Professional staff with highly specialized skills in areas such as job and skill analysis, survey design, statistical analysis or demographics will be needed. APDOT believes that the Department should maintain a centrally-located group of professionals to provide leadership and manage the program. Such Department staff will be responsible for framing key issues, reviewing core papers and recruiting staff expertise both within the Department and from outside research organizations.

In addition, in transforming the Occupational Analysis system into a high performance organization, staff must focus on the customer. Occupational analysts and other core staff should be encouraged to interact extensively with customers/users. The system must begin to rely on previously untapped resources, including extensive consultation with subject matter experts and increased contacts with professional and trade associations, labor unions, employers and others.

President Clinton has proposed a national information system to link homes, business labs, classrooms and libraries by the year 2015. The goal is to expand access to information.[16] APDOT believes that efforts to restructure the Occupational Analysis system and automate the DOT database represent an important step in the Administration's long-range plans. These actions will help the Department of Labor make comprehensive information on work, workers and skills available and accessible to all users.

17. *The Department of Labor should use the DOT as the foundation for related program efforts* **including** *the development of voluntary industry-based skill standards, the development of measures for assessing generic workplace skills and aptitudes and the proposed revision of the Standard Occupational Classification (SOC).*

If the nation is to succeed in developing a more productive and competitive workforce, the Department of Labor of should implement strategies for more fully integrating its skills and assessment initiatives with the development of

the new DOT. The DOT can be a vital tool in tracking changing occupation and skills requirements. In addition to APDOT's review of the DOT, efforts are currently underway within the Department to identify the key requirements of highly skilled workers in high performance workplaces, to increase the skill levels of American workers and to expand work-based training options. The Office of Work-Based Learning, in a joint initiative with. the Department of Education, has undertaken a demonstration project in which 13 national trade associations and education groups are developing and implementing voluntary skill standards in a wide range of industries.[17]

APDOT recommends that the Department integrate DOT development activities with the Office of Work-Based Learning planned technical assistance on industry-based skill standards. By integrating DOT development efforts with the technical assistance that will be offered to the organizations and associations engaged in developing voluntary industry-based skill standards, a synergy can be created that will dramatically benefit both initiatives. Participants involved in the industry-based skills project can help make the new DOT Content Model operational and thus assure that the new DOT meets their needs as a database for skill standards. In addition, they will gain access to data available in the DOT system related to the occupations and industry groups under study. The DOT is the nation's single most comprehensive source of data on occupations. The ability to access DOT data will likely save participants valuable resources and prevent them from reinventing the wheel in developing constructs for skill standards.

At the same time, DOT staff can use the industry experts involved in setting industry-based skill standards to help determine the validity and usefulness of current DOT data. The participants involved in setting industry-based skill standards are appropriate sources of information for determining which tasks, skills and occupational group clusters are valid for a new DOT. This information can also provide staff with a starting point for developing task inventories that can be used in data collection for the new DOT (structured questionnaires and survey methods).

APDOT believes that the revised DOT can also help the Department's numerous assessment initiatives move forward. The Department's Office of Strategic Planning and Policy Development, with support from the Department of Education and the Office of Personnel Management, has undertaken an effort to develop and validate measures of the generic workplace competencies put forth by SCANS. This effort is focused on identifying, verifying and describing what the competencies look like in the workplace. In addition, the United States Employment Service is engaged in developing new assessment measures. APDOT believes that these activities should use the same language and benchmarks as the DOT activities and be mutually reinforcing.

Finally, APDOT also advocates Department of Labor coordination in the upcoming revision process for the Standard Occupational Classification (SOC). The 1980 SOC is more than a decade old and in need of immediate updating. The SOC revision will be conducted under the leadership of the Bureau of Labor Statistics. During the revision process, APDOT recommends that the Employment and Training Administration and the Bureau of Labor Statistics continue to work together closely to assure that the information available in the DOT program is used in the revision and that planning and development for the new DOT are carried out in concert with the SOC revision. The DOT, the SOC and the OES program should be consolidated into one occupational taxonomy that serves the Department's overall needs and facilitates the development of the DOT database. APDOT also supports the continued coordination of current staff efforts to identify new and emerging occupations and include them in the DOT database.

18. *The Department of Labor should assure sufficient funding to develop the DOT database system. The Department should also make a commitment to provide additional resources for enhanced operational requirements*.

The creation of the new DOT database system will incur both start up and ongoing operational expenses. While recognizing the fiscal constraints facing the U.S. Government, APDOT believes that the Department of Labor

must consider the larger picture of economic change in the workplace and global competition. The Department and the nation will benefit from funding the efforts needed to revise the DOT and make it a useful tool for workforce revitalization into the twenty-first century.

APDOT has made recommendations for developing, producing and disseminating a new DOT that are fiscally responsible and consider return on investment. The Department of Labor must do everything it can to improve the cost efficiency of the DOT production process. To demonstrate a commitment to cost-effectiveness and fiscal restraint, APDOT has proposed recommendations that it expects will produce cost savings. These include: reducing the number of occupations detailed in the DOT; emphasizing survey methodology for data collection; using subject matter experts, associations, labor unions, employers and others to supplement data collection; and using state-of-the-art data collection technologies including existing job analysis methodologies.

Beyond any monetary savings gained for the Department of Labor through implementation of these recommendations are monetary savings for the nation. Because the data content planned for the new DOT is not now available, millions of students, workers and employers make uninformed choices and costly mistakes in their education, training, counseling and employment efforts. In addition, employers, state agencies and others currently spend millions of dollars to identify and capture such information. This results in duplicative and wasteful efforts. The Department may want to consider the feasibility of pooling resources with state agencies, employers, trade groups and others involved in delineating workforce skills. It may be possible for the Department to offer supplementary data collection on a cost reimbursable basis for specialized users who need data. above and beyond what is needed for the Department's programs and purposes.

APDOT believes that the Department of Labor should expand its funding base for the DOT in order to secure both the one-time resources needed to transform the system as well as the ongoing resources needed to maintain it. APDOT estimates developmental costs for the

new DOT including the conceptualization, design, development and acquisition of automated equipment and training in its use, to be on the order of $25 million over three to four years. Annual operational and maintenance costs could reach $5 to $8 million. All possible avenues of funding must be explored.

The value of the new DOT as a tool for creating the best-educated and best trained workforce in the world must be underscored. As a coherent national database system for improving the productivity and competitiveness of American workers, the DOT has a unique role. APDOT believes that the Department of Labor and the nation should recognize and support the DOT's fundamental contribution both now and into the twenty-first century.

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Advisory Panel for

APPENDICES

CONTENT MODEL

Overview

To help revitalize the American economy, the APDOT is recommending a national database system that collects, produces and maintains accurate, reliable and valid information on occupations. The new <u>Database of Occupational Titles</u> (DOT) would serve as a national benchmark and provide a common language for all users of occupational information.

The APDOT proposes the following Content Model as a framework for the new DOT. This model is intended to provide a coherent and integrated system that identifies the most important types of information about jobs and workers that APDOT believes should be considered for inclusion in the new DOT. **AIPDOT views this Content Model as an initial point of departure and subject to further research and analysis as well as administrative decisions that will. be made during implementation.** APDOT expects that specifies of the descriptors will be designed and developed based on future intensive research and that descriptors will be included when supporting data meet professional standards for reliability, validity and generalizability.
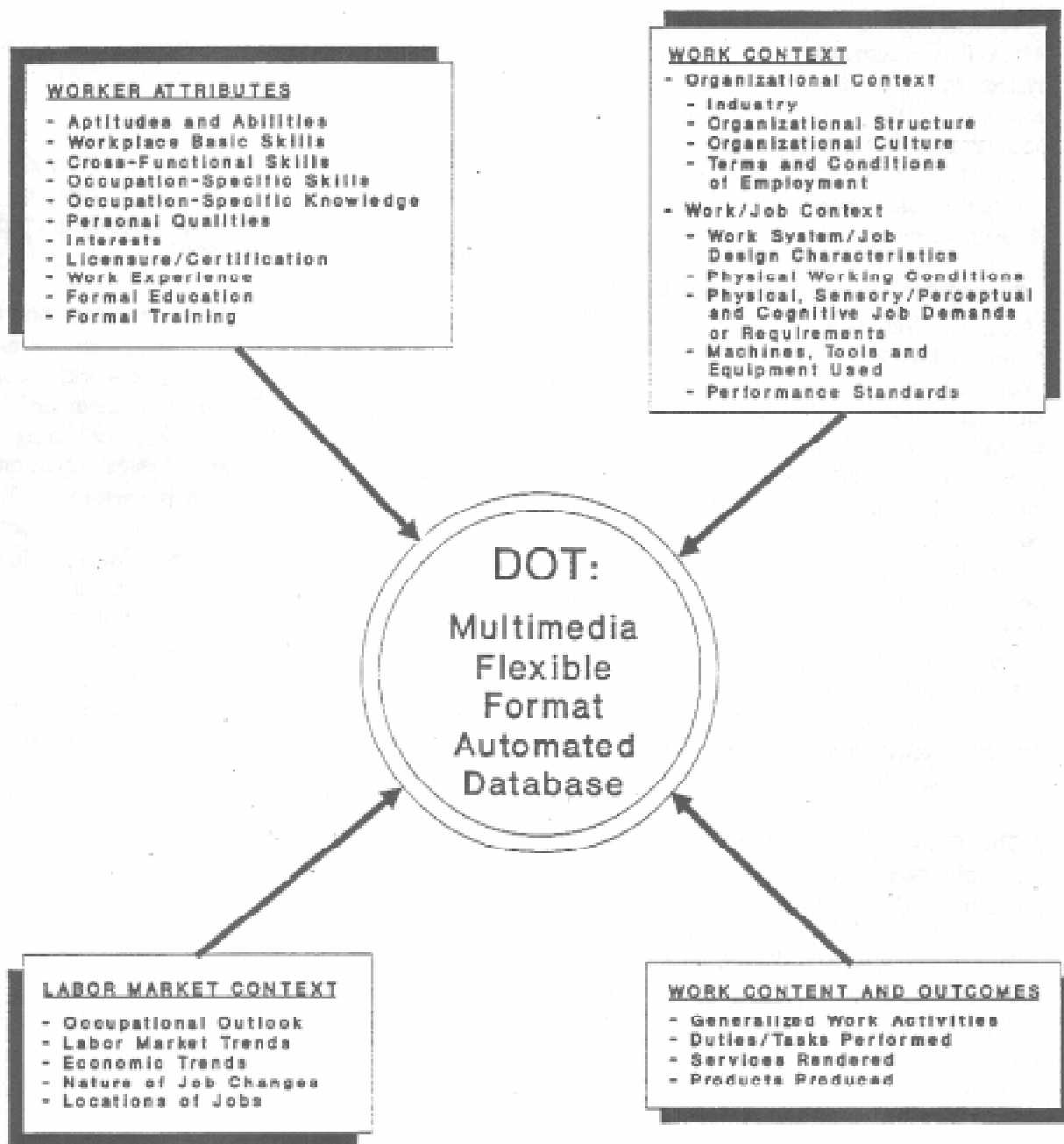
This Content Model has been drawn from a thorough analysis of user survey results, public comments and a wide-ranging review of research in such areas as job and skill analysis, human individual differences and organization analysis. It embodies a view of occupational analysis that reflects the characteristics both of occupations (through use of "job-oriented" descriptors) and of people (through use of "worker-oriented" descriptors) as well as the

This Content Model is not intended to imply that information or data regarding all of its components can or should be collected as part of a single job analysis instrument, or even as part of the job analysis process. Some information may more appropriately lend itself to determination through other forms of research or

data collection. For example, worker aptitude/ability patterns may be developed through aptitude test validation studies. In addition, some descriptors may be obtained through linkages with other databases and information sources. For example the development of such descriptors as occupational outlook information, labor market trends and occupational demographics may be completed by linking with appropriate databases developed by' sources outside of the DOT.

The Content Model is organized into four sections that are intended to represent the major elements of a systems model of work: Worker Attributes (Section I), reflecting input variables; Work Context (Section II), reflecting the organizational, social and physical environment or system in which a job is performed; Work Content and Outcomes (Section III), reflecting output variables; and Labor Market Context (Section IV), reflecting the broader economic system of which all jobs are a part. The Content Model is shown schematically in Figure B: The New DOT Content Model. Each section defines, provide examples of and in some cases lists more specific elements of a set of descriptor categories.

Figure B: The New DOT Content Model

WORKER ATTRIBUTES

- Aptitudes and Abilities
- Workplace Basic Skills
- Cross-Functional Skills
- Occupation-Specific Skills
- Occupation-Specific Knowledge
- Personal Qualities
- Interests
- Licensure/Certification
- Work Experience
- Formal Education
- Formal Training

WORK CONTEXT

- Organizational Context
  - Industry
  - Organizational Structure
  - Organizational Culture
  - Terms and Conditions of Employment
- Work/Job Context
  - Work System/Job Design Characteristics
  - Physical Working Conditions
  - Physical, Sensory/Perceptual and Cognitive Job Demands or Requirements
  - Machines, Tools and Equipment Used
  - Performance Standards

DOT:

Multimedia
Flexible
Format
Automated
Database

LABOR MARKET CONTEXT

- Occupational Outlook
- Labor Market Trends
- Economic Trends
- Nature of Job Changes
- Locations of Jobs

WORK CONTENT AND OUTCOMES

- Generalized Work Activities
- Duties/Tasks Performed
- Services Rendered
- Products Produced

CONTENT MODEL

I. Worker Attributes

This section includes a series of descriptor categories related to the characteristics or qualifications that a worker brings to a job. The first five descriptors listed represent an approximate hierarchy or continuum of skills-related information (moving from general to increasingly specific levels of description and analysis) that is expected to provide a wide range of application options for users requiring skills information of different types and at different levels of specificity. It is expected that appropriate verification, elaboration and specification of these descriptor categories and their specific component elements will require further research.

Aptitudes and Abilities. The capacity to perform particular classes or categories of mental and physical functions; examples include: cognitive abilities (examples include: verbal, quantitative, abstract reasoning), spatial/perceptual abilities (examples include: spatial orientation and visualization, perceptual speed, flexibility and speed of closure), psychomotor abilities (examples include: arm, manual, and finger dexterity, eye-hand coordination), sensory abilities (examples include: vision, hearing, color discrimination) and physical abilities (examples include: static strength, dynamic strength, stamina, extent flexibility).

Workplace Basic Skills. Fundamental developed abilities that are required to at least some degree in virtually all jobs. Examples include: reading, writing and arithmetic or computational abilities. (These are included as a separate descriptor category because, although related to aptitudes and abilities, they include significant knowledge and learning components.)

Cross-Functional Skills. The various types of developed generic skills that are related to the performance of broad categories of work activity that tend to occur across relatively wide ranges of jobs. Examples include: information gathering, oral communication, problem analysis, negotiating, organizing and planning, coordinating with others and coaching or mentoring.

Occupation-Specific Skills. The developed ability to perform given general or specific work activities that tend to occur across relatively narrower ranges of jobs and/or are defined in relatively job or activity specific terms; these are operationally defined as the ability to perform the generalized work activities and job duties/tasks, defined in Section III, or the ability to use or operate given machines, tools, or equipment, defined in Section II. Examples include: ability to read blueprints, ability to repair electrical appliances, ability to type and proofread statistical reports, ability to operate a milling machine and ability to operate a forklift.

Occupation-Specific Knowledge. Understanding or awareness of, or familiarity with, the facts, principles, processes, methods, or techniques related to a particular subject area, discipline, trade, science, or art. Includes knowledge of foreign languages, computer programming languages and specific computer software packages or applications. Examples include: financial planning and analysis, fire protection systems, computer graphics, data communication networks, patent law, Spanish, COBOL and spreadsheet software.

Personal Qualities. An individual's characteristic, habitual, or typical manner of thinking, feeling, behaving, or responding with respect to oneself, others, situations, or events. Examples include: self-esteem, sociability, responsibility and integrity/honesty.

Interests. Expressed affinity for performing particular types or categories or work tasks or activities, or applying particular types of skills. Examples include: realistic, investigative, artistic, social, enterprising and conventional.

Licensure/Certification. The type or name of particular state licenses or professional or technical certification programs required for given jobs or possessed by an individual. Examples include: Board of Certified Safety Professionals (BCSP) certification; Certified Public Accountant (CPA); Registered Nurse licensure; American Production and Inventory Control Society (APICS) certification; and Academy of Certified Social Workers (ACSW) certification.

Work Experience. The type and amount of either paid job experience (acquired in regular full- or part-time employment, military jobs, paid apprenticeship, internship, or trainee positions) or unpaid job experience (acquired in volunteer or civic activities or in student work-study programs) required or characteristic of workers in a given job or possessed by an individual.

Formal Education. The type and amount of secondary school, vocational-technical school, college, or university education required or characteristic of workers in a given job or possessed by an individual.

Formal Training. The type and amount of learning or instruction, acquired through such means as apprenticeships, certification programs, military training programs, practicums and organization- or association-sponsored training programs (but outside of formal academic or educational settings) required or characteristic of workers in a given job or possessed by an individual.

II. Work Context

This section includes descriptors for Organizational Context and Work/Job Context. Organizational context includes descriptors related primarily to the broader organizational system within which work is carried out. Work/Job Context includes descriptors related to the more immediate job context.

It should be noted that some of the descriptor categories and component elements listed in this section (more so than in other sections) are prone to vary as a function of the specific setting, location or type of organization in which a job is performed, and hence may not represent generalizable characteristics of a job or its context. APDOT's view is that this determination should be based on empirical job analysis. Such data can then be used to determine the most appropriate manner of treating such characteristics in a DOT occupational description.

ORGANIZATIONAL CONTEXT

Industry. The major or defining activity or purpose of the establishments in which a given job is performed, such as defined in the Standard Industrial Classification (SIC) system. Examples from the current SIC include: Retail Trade, Finance, Insurance, Real Estate and Health Services.

Organizational Structure. Includes such elements as:

. size of organization (examples include: number of employees, divisions, work units)
. type of organization (examples include: non-profit, conglomerate, multinational)
. degree of product or service diversity or specialization
. model of organizational structure and production control (examples include: hierarchical versus flat, centralized versus decentralized)
. reward structure (examples include: bases for wage and salary treatment, bases for performance and promotion evaluation)

Organizational Culture. Includes such elements as:

. operating values/style (examples include: institutional fairness, employee involvement, open communication, customer focus, continuous learning environment, entrepreneurial, diversity, social responsibility)
. strategic emphases (examples: include: quality, speed of production, innovation, low cost, automation/technology infusion)

Terms and Conditions of Employment, Includes such elements as:

. work schedule (examples include: hourly, shift work, daily)
. type of compensation (examples include: salary, wages, fee-for-service, incentive or commission)
. basis of compensation (examples include: hours worked, output produced, products or services sold)
. amount of compensation (examples include: ranges)
. travel or relocation requirements
. degree to which work is unionized
. special clothing or uniform requirements

WORK/JOB CONTEXT

Work System/job Design Characteristics. The characteristic manner in which a given job is designed and work is organized, especially in relationship to other aspects of the organizational system of which the job is a part. (Note: The combination of many of these elements may be used to define what has come to be called a "high performance" workplace or organization, and hence may help to determine the degree to which it is appropriate to characterize a given organization or work setting in this manner.) Examples of such elements include:

- degree of shared or interdependent task or job responsibility (examples include: team vs. individual organization of work)
- degree and nature of interactions with technology
- decision making and/or dollar accountability (examples include: degree of empowerment, autonomy or latitude for judgment)
- degree to which job entails performance of a variety of tasks or use of a variety of skills
- degree of task or job identity
- skill or knowledge acquisition or maintenance demands (examples include: degree to which frequent or continuous learning is required)
- nature of job impact (examples include: remote, indirect, contributory, shared, direct)
- degree of job impact (examples include: sphere of influence, number of people affected)
- degree of structure (examples include: presence of formal guidelines, policies or standard. procedures)
- pace or intensity of work
- degree and duration of contact with others
- scope and nature of communications or interactions with others
- nature and degree of formal responsibility for directing or supervising the work of others
- degree of stability or dynamism in work schedules, methods and procedures or job duties and responsibilities
- degree and type of performance feedback available

Physical Working Conditions. The nature of the immediate physical environment in which a job is performed. Includes such elements as:

- the nature or type of work setting (examples include: indoor/outdoor)
- type of work location (examples include: factory, office)
- physical hazards present (examples include: chemicals, radiation, combustibles, etc.)
- physical discomforts present (examples include: noise, vibration, odors, dust, fumes, etc.

Physical, Sensory/Perceptual and Cognitive Job Demands or Requirements. An occupation's characteristic type and degree of physical (examples include: standing, carrying, lifting, climbing, stooping), sensory/perceptual (examples include: color or auditory discrimination, depth perception) and cognitive (examples include: vigilance or information encoding, processing and retrieval) job demands.

Machines, Tools and Equipment Used. Physical instruments or devices used to carry out or facilitate the completion of particular jobs, work activities or tasks. Examples include: printing press, electric hoist, bulldozer, milling machine, pneumatic hammer, tape measure, camera, photocopying machine, facsimile machine, laptop computer, radio transmitter and video recorder.

Performance Standards. The nature of the production or quality criteria by which the work performed in a given job is typically judged or evaluated. Examples include: amount produced, quality sold, error or defect rates and timeliness of production or service.

III. Work Content and Outcomes

This section includes a series of descriptor categories related to the content of the work actually carried out by an individual and the outcomes resulting from this work.

Generalized Work, Activities. Aggregations of related duties or tasks into somewhat more general activity statements that do not include *highly* job-specific content. Examples include: writing technical reports, reading blueprints, preparing budgets and repairing electrical appliances.

Duties/Tasks Performed. The specific work steps, elements or activities performed in order to achieve a given work objective. Examples include: locate and repair leaks in pressurized cable, prepare written replies to customer inquiries or complaints and type and proofread statistical reports.

Services Rendered. The services provided by an individual or organization based on the work that individuals or work teams perform. Examples include: guidance and counseling, cleaning, teaching and medical testing.

Products Produced. The products designed, developed, made or manufactured by an individual or organization based on the work that individuals or work teams complete. Examples include: automobile parts, compact discs and food products.

IV. Labor Market Context

This section includes a series of descriptor categories related to the broader economic and labor market setting in which jobs are performed, as well as information regarding how these factors affect given jobs. It is expected that the information comprising this category will not be obtained from the job analysis process used to gather data on individual jobs, but rather from linkages with other databases and information sources such as those developed by the U.S Office of Personnel Management (Opm), Bureau of Labor Statistics (BLS) and the U.S. Department of Education.

Occupational Outlook. Information related to the future of the occupation, describing potential educational and occupational requirements and employment prospects. Examples. include: BLS information on occupational outlook and OPM projections for future employment.

Labor Market Trends. Information related to current and future employment in specific occupations. Examples include: total employment for specific occupations.

Economic Trends. Information related to economic patterns that have implications for employment. Examples include: growth patterns by industry and/or occupation

Nature of Job Changes. Information related to changes in occupations. Examples include: changes in employment, occupational requirements and industry.

Locations of Jobs. Information related to location of occupations geographically or within the organization. Examples include: total employment of specific occupations by geographic area, organizational unit where occupation may be located such as printing. department, audio visual department.

APDOT'S ROLE IN REVITALIZING THE DOT

To lead its analysis of the changes needed to make the DOT a useful tool for the twenty-first century, the Department of Labor created the Advisory Panel for the Dictionary of Occupational Tides (APDOT). The Department charged the Panel with making recommendations regarding the production, publication and dissemination of the DOT. Asking representatives of key user groups and nationally recognized experts of occupational information to study the nation's occupational information needs and assess the DOT's ability to meet those needs, was seen as an efficient and effective strategy for addressing this complex issue.

The participation of the APDOT afforded the Department the opportunity to expand the range of expertise and perspectives available for the effort. As a Secretarial Initiative, the review of the DOT was envisioned as part of a national agenda keyed to workforce quality. The charge to the Panel focused on the current and future needs of the occupational information user community. Chartered under The Federal Advisory Committee Act, APDOT was specifically required to:

(1) Recommend the type and scope of coverage as well as the level of detail that should be collected on occupations to produce a DOT;

(2) Advise on appropriateness of methodologies of occupational analysis used to identify, classify define and describe jobs in the DOT;

(3) Advise on new or alternative approaches to the production, publication and dissemination of the DOT; and

(4) Recommend options for implementation of improvements to the DOT.

The approach to the entire review was articulated in a concept paper developed by the Department. This concept paper was the first of several products to be published in the Federal Register and mailed to interested parties. (August 1990).

Expert Advice and Papers

Since October 1990, the Panel has held quarterly public meetings where experts and members of the public were invited to offer testimony on key issues under discussion. By December 1992, close to 50 experts and user groups had addressed the APDOT and scores of staff papers and expert technical reports had been commissioned on topics including: the impact of the changing world of work; skills issues; classification issues; generalized work activities; reliability and validity of current descriptors; alternative job analysis methodologies; automation issues and options; coordination and integration with the Standard Occupational Classification (SOC) system; the needs of special user groups such as vocational rehabilitation; linkage with other databases such as the National Assessment of Educational Progress (NAEP); and the status of vendor products based on the DOT.

Notices of all public meetings were published in the Federal Register and mailed to a core list of interested persons along with papers and reports produced for the Panel. A list of papers produced for the APDOT is included in Appendix E to this Final Report. These materials and papers serve as supporting documentation for the APDOT recommendations. APDOT anticipates that they will eventually be published as a separate document.

Subcommittees and Workshops

During most of its tenure, APDOT maintained only 12 members, a relatively small group to be charged with such a complex task. To make the most efficient use of the limited number of APDOT members, each was assigned to subcommittee activities. The original two subcommittees focused on Skills Issues and Purpose/Uses of the DOT. As the project progressed, these groups were refocused on the proposed DOT Content Model as well as the Final Recommendations. As part of their subcommittee activities, APDOT members also presided over special workshops conducted for them and DOT Review staff. They reported on the results of these sessions at public meetings. These workshops included a session on job analysis methodologies used in the military services in July 1992 and a session convened in September 1992 by the American Psychological Association (APA). The APA workshop brought together a group of national experts to review a series of papers commissioned by the Panel and to offer expert advice on the potential role of cognitive science in a new DOT. Potential strategies for measuring, cognitive abilities were seen as a critical issue for the DOT of the future because of the increasingly cognitive requirements of the workplace.

International Research

To assure that APDOT had the best available information on the cutting-edge issues they were grappling with, the Department also undertook research on equivalent labor market tools currently used or under development by economic trading partners, including Australia, Canada, France, Germany, Japan, Sweden and the United Kingdom. Experts at the International Labor Office in Geneva worked with the Department to identify experts in individual countries who prepared a series of reports. Early in the project, additional expertise was hired to undertake a study of the changes to the Canadian occupational information system. The old Canadian system had been modeled closely on the DOT and was currently undergoing a radical transformation to a skills-based system.

Interim Report

In March 1992, the APDOT submitted an Interim Report to the Secretary of Labor, published it in the Federal Register and distributed copies to some 5,000 interested persons to generate public response. The APDOT Interim Report discussed activities undertaken to date, tentative findings and potential options for recommendations. The report was part of a concerted effort by the APDOT to solicit input from users throughout the review process. User groups and representatives were invited to testify at meetings and to submit papers. Staff constructed tentative user profiles to help APDOT focus on user and use issues while data from an empirically-based user survey were collected and analyzed. A comprehensive analysis of the responses APDOT received regarding the Interim Report was made and reported back to APDOT. As mentioned earlier, the project also undertook a user survey that attempted to clarify user perspectives on the DOT and to identify user attitudes toward potential changes.

ADVISORY PANEL FOR THE DICTIONARY OF OCCUPATIONAL TITLES (APDOT) MEMBERS

Dixie Sommers, APDOT Chair, is currently Deputy Administrator at the Ohio Bureau of Employment Services in Columbus, Ohio, where she has responsibility for information systems, labor market information, and workforce development policy. She is also leading the development of an innovative Employment Service automation system. Previously, Ms. Sommers served as Director of the Bureau's Labor Market Information Division. In 1991, she was a consultant with The World Bank on employment security programs in Eastern Europe. Ms. Sommers has also worked in the labor and occupational information area in the Federal service. She was on the staff of the National Occupational Information Coordinating Committee (NOICC) for four years, where she directed the development of technical materials for use in improving and delivering occupational information, including the development of occupational and educational classification crosswalks. Ms. Sommers started her career as a labor economist at the Bureau of Labor Statistics and conducted research on occupational mobility.

Ken Baker is Director of Marketing for Freeman White Architects. In 1984, he received a White House appointment as a Representative of the U.S. Secretary of Labor where he served as a liaison with the Federal agencies and elected state officials. Mr. Baker has also been a member of the Tennessee House of Representatives where he served on the Government Operations Committee. During his legislative service, Mr. Baker was a small business owner, developing one of West Tennessee's largest travel agencies. He is also a former school teacher.

Sue E. Berryman is an Education Specialist with The World Bank in Washington, D.C., where she provides technical expertise for the Bank's human capital work in the Middle East, North Africa, Eastern Europe and the former countries of the Soviet Union. From 1985-1992 she directed the Institute on Education and the Economy at Teachers College, Columbia University, in New York City, a research institute that focuses on the implications of changes in the U.S. economy and workplaces for needed changes in the U.S. education and training system. She was a Behavioral Scientist with the RAND Corporation for 12, years, after serving on the faculty of the University of Minnesota, working as a research associate in the Director's Division of the Oak Ridge National Laboratory, and teaching at the Harvard Business School. She is a member of several national advisory boards and an invited speaker at many conferences on education and employability in the United States. She has served on several National Academy of Sciences and National Academy of Engineering panels and currently serves on the Academy's Committee on Postsecondary Education and Training for the Workplace. Her most recent book, co-authored with Thomas R. Bailey, is The Double Helix of Education and the Economy.

Manfred Emmrich is the Director of the Employment Service Division of the Employment Security Commission of North Carolina. He is responsible for the operation of 78 local Job Service Centers across the state. Previously, Mr. Emnirich served as a Senior Associate with MDC, Inc., a research and development group with special interests in workforce and economic development issues. Mr. Emmrich was also Chairman of the Employment Security Commission of North Carolina from 1973 to 1978. He is a past president of the Interstate Conference of Employment Security Agencies. Mr. Emmrich holds a bachelor's degree in economics from Davidson College.

Marilyn Gowing is Assistant Director for Personnel Research and Development for the U.S. Office of Personnel Management (OPM). Previously, Dr. Gowing has held positions with a variety of public and private sector organizations. She has received awards from the Internal Revenue Service, the

Department of Housing and Urban Development, the International Personnel Management Association, the American Society of Association Executives and OPM. She has served as a national officer for the Society for Industrial and Organizational Psychology and is a Past President of the Personnel Testing Council/Metropolitan Washington. Dr. Gowing holds a bachelor's degree from the College of William and Mary and a master's and Ph.D. in industrial and organizational psychology from George Washington University which recognized her with a Distinguished Alumna Award. She has written numerous articles for professional journals, chapters for books and has co-authored a book on job analysis entitled Taxonomies of Human Performance: The Description of Human Tasks.

Reese Hammond is currently the President of TOR Associates. From 1961 to 1990 he was the Director of Education and Training at The International Union of Operating Engineers IUOE). Mr. Hammond has published various papers in the area of human resources development, apprenticeship, education, training and pension fund administration. He developed The National Apprenticeship System for Operating Engineers and he developed, negotiated and implemented the first union-sponsored Job Corps vocational program in 1966. From 1983 to 1989 he was a member of the Advisory Policy Committee of the National Assessment of Educational Progress. Mr. Hammond is a member of the Advisory Committee at the George Meany Center for Labor Studies, Antioch College External Degree Program.

Anita R. Lancaster is Assistant Director of Program Management, Defense Manpower Data Center (DMDC), the central _organization within defense that collects and integrates automated manpower and personnel data, and conducts research on behalf of the Office of the Secretary of Defense. She previously served as Assistant Director for Accession Policy, Office of the Assistant Secretary of Defense for Force Management and Personnel, and had policy oversight for military personnel testing, enlistment standards and processing, and Joint-Service military occupational information. She has served as trustee, National Career Development Association, and was awarded the Secretary of Defense's Meritorious Civilian Service Medal 'in recognition of her achievements in military testing and occupational information development. Dr. Lancaster holds a Ph.D. in educational guidance and counseling from Wayne State University.

Malcolm H. Morrison is Vice President, Operations Research and Program Effectiveness at Continental Medical Systems, Inc., Mechanicsburg, Pennsylvania. Previously Dr. Morrison was Director of Research and Information Services for the National Association of Rehabilitation Facilities. He also served as Director of Disability Research for the Social Security Administration and held a number of positions at the U.S. Department of Labor in the Employment Standards Administration. Dr. Morrison is an international expert on disability, health and employment, and has published widely in these fields. He serves as an advisor to major foundations and government agencies. He received his Ph.D. in Social Welfare Policy from The Florence Heller Graduate School of Brandeis University and also holds masters degrees from The University of Michigan and Boston University. His undergraduate training was completed at Mcgill University in Montreal, Canada.

Kenneth Pearlman is a District Manager in AT&T's Corporate Human Resources Department, where he has been responsible for management selection research and development since 1983. Previously, he spent nine years as a personnel research psychologist at the U.S. Office of Personnel Management. He has specialized in the research, development, and evaluation of methods and programs for personnel selection, job and skill analysis and person-job matching. He has authored many professional journal articles, technical reports, papers and book chapters in the areas of job family development, cumulative analysis of research results, and the productivity implications of person-job matching procedures and systems. He is a senior editor of widely used text of readings in personnel. He has consulted to public and private organizations and has served as a reviewer for the major professional journals in applied and personnel psychology. Dr. Pearlman holds-a bachelor's degree in psychology from the Catholic University of America and a Ph.D. in industrial and organizational psychology from George Washington University.

Richard Santos is an Associate Professor of Economics at the University of New Mexico. He is a graduate of Michigan State School of Labor and Industrial Relations and his areas of research interests include Hispanic employment, school to work issues and health care economics. His publications include articles on employment and a book on Hispanic youth. Some of his recent research topics are the implications of the North American Free Trade Agreement for Mexican American workers and the education and employment patterns of Hispanic high school graduates.

C. Gary Standridge is Director of the Research and Development Department for Fort Worth Independent School District. He has extensive experience in developing, implementing and evaluating education programs and in working with business alliances to improve education systems. A graduate of the University of Arkansas at Fayetteville, Dr. Standridge has received the following recognition: National Superintendent's Academy, Who's Who in American Education, \I\D\E\A\ Distinguished Educator Award, President of Phi Delta Kappa Network and the Arkansas Co-op Directors. As project coordinator, Dr. Standridge helped design and implement Project C, a cooperative effort involving the Community, Corporations, and Classrooms working together to create a new education system in the Fort Worth ISD. Project C3 has received national attention through affiliations with the National Alliance of Business and the American Business Conference and was highlighted in newspaper articles in The Wall Street Journal and The Washington Post.

Charles G. Tetro is President and CEO of Training and Development Corporation, a national, not for-profit, educational management, training and consulting organization headquartered in Bucksport. Maine. He has also served as the Chief Executive Officer of the New England Institute for Human Resource Planning and Management since 1979 and as Executive Director of the Penobscot Consortium since 1975. Mr. Tetro is a past president of the New England Training and Employment Council, has taught in Boston University's graduate program in Urban Studies, and has served on numerous local, regional and national boards and commissions such as the Maine Coalition on Excellence in Education, The Maine Development Foundation, Husson College, the Coalition for Sensible Energy, Northeastern University's Center for Labor Market Studies, and the Secretary of Labor's Advisory Committees on Job Corps and on the Job Training Partnership Act. Mr. Tetro's recent writing includes Kaputnik: An Inquiry into the Nature of Entropy and the Dissolution of Conteml2orga Social and Economic Institutions and with John Doffer,-PRAXIS: Re-engineering Government at tile Point of Service.

Marilyn B. Silver, Executive Director, APDOT, is also Project Director. An employee of Aguirre International, Dr. Silver manages, organizes and staffs activities of the Advisory Panel on-site within the Department of Labor. Fr6m 1981-1990, Dr. Silver was at the National Alliance of Business where she served as Vice President, Youth and Education and managed a variety of national demonstration projects focused on education reform, employment and training policy, occupational information and workplace skills. She designed, developed and implemented training programs for business, government and education, receiving four NAB President's Awards and an IBM Quality Achievement Award. Dr. Silver also served for five years on the faculty of Delaware Technical and Community College, Wilmington, DE. She is the author of numerous books, trainer's guides and articles on subjects including: workplace skills, education reform, marketing, adult learning theory and practice, technical writing and negotiation strategies. Dr. Silver has her A.B. from Temple University and her Ph.D. from the Ohio State University.

Donna M. Dye is Personnel Research Psychologist in the U.S. Employment Service and Project Officer for the DOT Review, a Secretarial Initiative. She is also Program Manager for 'the Occupational Analysis Program, the research arm for the current DOT. Previously she provided leadership and Direction for test development research projects for the General Aptitude Test Battery (GATB). For her work in the Employment Service, she earned quality performance awards for the past four years. Ms. Dye also has experience in Employment and Training Administration (ETA) Regional Offices as a

Federal Representative for ETA grants dealing with employment and training issues. Prior to joining the Federal Government, Ms. Dye served in the Michigan Employment Security Commission as an employment interviewer, counselor, program manager and contract developer. She gained international experience in counseling and vocational education at the Community College of Micronesia. Ms. Dye has a masters degree from Wayne State University, Detroit, Michigan, and a bachelors's degree from Marygrove College, Detroit, Michigan.

FINAL RECOMMENDATIONS AND APDOT'S CHARTER

What follows are APDOT's specific recommendations organized according to the mandates of the Panel's Charter:

I. **Recommend the type and scope of coverage as well as the level of detail that should be collected on occupations to produce a DOT.**

1. The purpose of the <u>Database of Occupational Titles</u> (DOT) should be to promote the effective education, training, counseling and employment of the American workforce. The DOT should be restructured to accomplish its purpose by providing a database system that identifies, defines, classifies and describes occupations in the economy in an accessible and flexible manner. Moreover, the DOT should serve as a national benchmark that provides a common language for 0 users of occupational information.

2. The scope of the DOT should cover all occupations in the United States economy.

4. The level of detail used in the DOT database should be sufficiently flexible to match the recommended standardized occupational classification, while allowing for further differentiation of occupations based on user needs and on the information collected.

5. The Department of Labor should adopt the APDOT "Content Model" as a framework for identifying the occupational information included in the. DOT. The Content Model's specific descriptors or data elements should be developed as part of the implementation phase of the new DOT.

7. As the funding source for the DOT, the Department of Labor should appropriately rank its own program needs as the top priority. In meeting the Department's needs, APDOT also expects the occupational information included in the DOT to meet most of the needs of specialized users involved in workforce education, training, counseling and employment.

II. **Advise on appropriateness of methodologies of occupational analysis used to identify, classify, define and describe jobs in the DOT.**

3. The Department of Labor should use a single standardized occupational classification for the DOT and its labor market data collection programs. A single standardized classification will allow the DOT and other sources of occupational and labor market information to be technically and conceptually compatible.

6. ?Me Department of Labor should review every occupation detailed in the DOT at least every five years to assure that the DOT database remains current and that occupational data contained within it are updated regularly. Some selected occupations should be reviewed more frequently.

8. The Department of Labor should use sampling techniques in the collection of data for the DOT that ensure the representativeness of occupations and, the accuracy and consistency of information. The sampling, design should make use of existing. empirical information on employment by occupation and on the-location and industry of employers.

9. The Department of Labor should rely on the use of structured job analysis questionnaires as the primary strategy for data collection. Alternative methods may be used to supplement data collection when warranted.

10. The Department of Labor should collect occupational information using automated technologies to facilitate quality control and to achieve currency and accuracy in a cost effective manner.

III. **Advise on new or alternative approaches to the production, publication and dissemination of the DOT.**

11. The Department of Labor should make a dynamic and flexible DOT database available in a variety of electronic, automated and hard copy formats to meet the varying needs of users involved in workforce development. The Department of Labor should invest in developing value-added applications as needed for its own use and where cost-effective. The Department should also continue to encourage the vendor industry to develop specialized, value-added applications. Moreover, DOT data should remain available to the public at the cost of reproduction or publication.

12. The Department of Labor should develop a continuing marketing campaign to educate and inform users about the DOT database, its content and its use.

IV. **Recommend options for implementation of improvements to the DOT.**

13. By the year 1996, the Department of Labor should develop a new, comprehensive, national database system that collects, produces, maintains and disseminates accurate, reliable and valid information on occupations to support the nation's workforce investment efforts. By 1-994, the Department of Labor should develop a prototype database system that demonstrates the feasibility of new collection, analysis and dissemination strategies for target industries and occupations.

14. While focusing efforts on activities designed to produce a new DOT database system, the Department of Labor should, maintain the existing DOT and develop interim products as appropriate.

15. The Department of Labor should commit to an ongoing research and development agenda to maintain the DOT database system's effectiveness over time.

16. The Department of Labor should assure that the staff and organization of its Occupational Analysis system reflect changes in the methods of data collection, occupational analysis and information dissemination required by the new 150T system. The Department should also sustain a commitment to recruit, train and maintain a core staff of methodologically sophisticated professionals to manage the DOT program.

17. The Department of Labor should use the DOT as the foundation for related program efforts including the development of voluntary industry-based skill standards, the development of measures for assessing generic workplace skills and aptitudes and the proposed revision of the Standard Occupational Classification (SOC).

18. The Department of Labor should assure sufficient funding to develop the DOT database system. The Department should also make a commitment to provide additional resources for enhanced operational requirements.

LIST OF TECHNICAL REPORTS SUPPORTING THE WORK OF THE
ADVISORY PANEL FOR THE DICTIONARY OF OCCUPATIONAL TITLES

Advisory Panel for the Dictionary of Occupational Titles. Interim R. Mort, March 1992. Report presenting interim findings and recommendations of APDOT.

American Psychological Association. Implications of Cognitive Psychology and Cognitive Task Analysis for the Revision of the Dictionary of Occupational Titles, September 22, 1992. Final report of American Psychological Association workshop on cognitive psychology and task analysis.

Bertrand, Olivier. Sources of Occupational Information in France, January 1991. International Labor Office report on French classification systems.

Black, John B. Cognitive Task Analysis, 1992. Technical paper developed for American Psychological Association workshop on cognitive psychology and task analysis.

Botterbusch, Karl F. Suggestions for Revisions -in- the Dictionary of Occupational Titles, October 19, 1992. Technical paper examining the current and proposed content of the DOT in relation to special user needs associated with vocational and rehabilitative counseling and disability determination and adjudication.

Campbell, John P. Alternative- Job Analysis Models and Their Potential Application to a Revised Dictionary of Occupational Tides, August 1992. Technical paper developed for American Psychological Association workshop on cognitive psychology and task analysis.

Campion, Michael A. Job Analysis for the Proposed Revision of the Dictionary of Occupational Titles (DON, August 25, 1992. Technical paper developed for American Psychological Association workshop on cognitive psychology and task analysis.

Cooke, Nancy J. The Implications of Cognitive 3:ask Analyses for the Revision of the Dictionary of Occupational Titles, 1992. Technical paper developed for American Psychological Association workshop on cognitive psychology and task analysis.

Cunningham, J.W. and Wilson, Mark A. The Functions of Generalized Work Behaviors and Nomothetic Job Descriptors in a National Computerized Occupational Information and Classification System, March 10, 1993. Technical paper examining Generalized Work Behaviors within the context of the DOT.

DOT Review. The DOT Review Initiative, February 23, 1993. Brief summary of the DOT Review and the Advisory Panel for the Dictionary of Occupational Titles (APDOT).

DOT Review Staff Working Paper. Purpose and Uses of the DOT, September 17, 1991. Report describing uses of the DOT by various categories of users.

DOT Review Staff Working Paper. Department of Labor Uses of the DOT, December 20,1991. Report describing various uses of the DOT within the Department of Labor.

DOT Review Staff Working Paper. Skills Issues in the DOT, September 20, 1991. Report examining skills and their presentation in the DOT.

DOT Review Staff Working Paper. Interim Skills Technical Report. December 31, 1991.

DOT Review Staff Working Paper. Job Analysis Methodologies, April 17, 1992. Report examining the features of several job analysis methodologies.

DOT Review Staff Working Paper. Classification Issues and Options, June 3, 1992. Report examining classification systems within the, context of the DOT.

DOT Review Staff Working Paper. Collection. Publication & Dissemination of DOT Data, August 1992. Report examining the potential use of computerized technology for the new DOT.

DOT Review Staff Working Paper. Standard Occupational Classification Principles of Classification, September 2, 1992. Report examining the use of the SOC for the DOT's classification system.

Drewes, Donald W. Job Analysis Methodologies: A Comparative Review, August 1992. Technical paper comparing five job analysis methodologies.

Drewes, Donald W. The Role of General Work Activities in the DOT Review, January 1993. Technical paper examining the potential application of general work activities to the design of a future DOT.

Dymmel, Michael D. An Analysis of the Public Response to the Interim Report of the Advisory Panel for the Dictionary of Occupational Titles (APDOT), September 15, 1992. Report providing a comprehensive analysis of the public response to APDOT's Interim Report.

Elias, Peter. The Use and Gathering of Occupational Information in the United Kingdom, September 1991. International Labor Office report examining classification systems in the United Kingdom.

Embury, Brian L. The Use and Gathering of Occupational Information in Australia, June 25, 1991. International Labor Office report examining Australian classification systems.

Fleishman, Edwin A. Psychomotor Physical and Interpersonal Requirements of Work: Implications for Revision of the Dictionary of Occupational Titles (DOT), December 1992. Technical paper that identifies and defines the psychomotor, physical, and interpersonal characteristics associated with the performance of work within the context of the DOT.

Geyer, Paul D. Issues of Reliability in Ratings of Occupational Characteristics in the Dictionary o Occupational Titles, September 21, 1992. Technical paper documenting the reliability and validity of occupational characteristics in the DOT.

Gitomer, Drew H. Cognitive Science Implications for Revising DOT, August 1992. Technical paper developed for American Psychological Association workshop on cognitive psychology and task analysis.

Harvey, Robert J. Potential A212lications of Generalized Work Behaviors (GWBs) for the Dictionary of Occupational -Titles (DOT), Draft Interim Report, November 10, 1992. Technical paper examining the application of Generalized Work Behaviors within the context of the DOT.

Hoffmann, Eivind. Report on the National Occupational Dictionary and Classification System Used in Sweden, August 1991. International Labor Office report examining Swedish classification systems.

Hoffmann, Eivind. Mapping the World of Work, An International Review of the Use and Gathering of Occupational Information, December 20, 1991. International Labor Office report summarizing international classification systems.

Hogan, Joyce. <u>Describing Interpersonal. Physical and Psychomotor Skills for the Dictionary *of* Occupational Titles,</u> December 15, 1992. Technical paper identifying and defining psychomotor, physical, and interpersonal work characteristics within the context of the DOT.

Jearmeret, Paul R. <u>Potential Application of Generalized Work Behaviors in the Development of a Revised Dictionary of Occupational Titles,</u> December 1992. Technical paper examining the potential application of Generalized Work Behaviors within the context of the DOT.

Levine, Edward L. <u>Critigue of the Paper, "Job Descriptions for the 21st Century "</u> September 1992. Technical paper examining the use of skills matrices to replace job descriptions.

Meridian Corporation. <u>The Changing World of Work: Implications for the DOT Review Initiative,</u> April 5, 1991. Report examining changes in the world of work and potential DOT responses.

Mission Permanente du Japon. <u>Responses to the International Labour Office's Questions about the U.S. Dictionary of Occupational Titles,</u> December 21, 1990. International Labour Office report on Japanese classification systems.

Morgenthau, Eleanor Dietrich. <u>Identification of How Commercial Products Publish and Disseminate DOT Data,</u> October 30, 1992. Report examining the DOT and related products vendor and developer industry.

Morgenthau, Eleanor Dietrich and Lenz, Janet. <u>International Practices: Occupational Classification and Description,</u> December 1992. Report summarizing the characteristics of international systems of occupational classification and dictionaries.

Packer, Arnold. <u>Speaking in One Tongue: Integrating the NAEP and DOT via the SCANS Know-How,</u> October 31, 1992. Report outlining the integration of SCANS competencies into the DOT.

Schoorlemmer, Annelie and Meesters, Marion. <u>Classification and Information Systems of Jobs and Occupations in the Netherlands,</u> January 10, 1992. International Labour Office report on classification systems in the Netherlands.

Silver, Marilyn B. <u>Advisory Panel for the Dictionary of Occupational Titles. Reference Guide Package,</u> October 24-25, 1990. Report describing the background and operations of APDOT, and the roles and responsibilities of key players.

Silver, Marilyn B. <u>Summary of Public Response to DOT Concern Paper Published in the Federal Register,</u> December 18, 1990. Analysis of public viewpoints of the DOT Review Initiative.

Silver, Marilyn B. <u>APDOT Management</u> Report: <u>The Changing the World or Work: Implications for the DOT Review Initiative</u> (Meridian Corporation, 1991), April 8, 1991. Report summarizing the Meridian publication on the changing world of work for APDOT.

Stevens, David W. <u>Canada's National Occupational Classification Taxonomy,</u> December 1991. Technical paper examining the classification system being developed in Canada.

Stevens, David W. and Cohen, Malcolm S. <u>The Feasibility of a Coordinated Approach to Revise the Dictionary of Occupational Titles and Standard _Occupational Classification Systems,</u> January 5, 1993. Technical paper examining a coordinated SOC-DOT approach to classification or the possible creation of a single classification system.

U.S. Department of Labor. <u>An Invitation to Participate in a U.S. Department of Labor Survey of Users of the Dictionary of Occupational Titles,</u> April 1992. Text of the survey of DOT users.

U.S. Department of Labor, Employment and Training Administration. <u>Dictionary of Occupational Titles Issue Paper and Initiative, Federal Register,</u> August 10, 1990. Initial publication of the issues and intent of the DOT Review.

Westat, Inc. <u>DOT User Survey: A Report and Analysis,</u> February 1993. Technical report analyzing user survey responses.

Studies undertaken in conjunction with the Bureau of Labor Statistics, scheduled for completion no later than May 1993:

Dempsey, Richard E. Study that examines and addresses issues related to how a new Standard Occupational Classification can be used to collect data from both employers and households.

Economic Roundtable. Study that examines and addresses issues related to the future use of the Standard Occupation Classification, both domestically and internationally.

Popkin, Joel. Study that conceptualizes an ideal standard classification system to integrate the SOC and the DOT.

Weinstein, Emanuel. Study that examines and addresses the issues related to developing a DOT and SOC which are conceptually and technically compatible.

APDOT MEETING PRESENTERS

Invited Presenters at APDOT Public Meetings

Deborah Bloch, President, National Career Development Association

Karl F. Botterbusch, Vocational 'Consulting Associates & Professor, Research and Training Center, University of Wisconsin-Stout

Peter Carlson, Managing Director, National Advisory Commission on Work-Based Learning, U.S. Department of Labor

John P. Coyne, Director, Information Systems Management, George Washington University

Donald Drewes, North Carolina State University

Lloyd Feldman, Westat, Inc.

Richard Garner, Systems Engineering, OGDEN/ERC

Carolyn Golding, Deputy Assistant Secretary of Labor, U.S. Department of Labor

Lucy Gray, Westat, Inc.

Donna Gregory, U.S. Office of Personnel Management

Eivind Hoffmann, Chief, Statistics of Employment and Unemployment Section, Bureau of Statistics, International Labour Office

Les Janis, Director, Georgia Career Information Center, Georgia State University

Roberts T. Jones, Assistant Secretary of Labor, U.S. Department of Labor

Michael Kane, Pelavin Associates, Inc.

Robert Litman, Acting Director, U.S. Employment Service, U.S. Department of Labor

Charles McNeil, Manager, Employment Security Commission, Henderson, North Carolina

Eleanor Morgenthau, Directions

Harvey Ollis, National Occupational Information Coordinating Committee

Brian S. O'Leary, U.S. Office of Personnel Management

Arnold Packer, Executive Director, Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor & Chairman, Institute for Policy Studies, SCANS/2000 Program, The Johns Hopkins University

Thomas J. Plewes, Associate Commissioner, Office of Employment and Unemployment Statistics, Bureau of Labor Statistics, U.S. Department of Labor

Kay Raithel, Director, Missouri Occupational Information Coordinating Committee

Margaret Roberts, Chief, Occupational Information Development Division, Employment and Immigration Canada

Neal H. Rosenthal, Chief, Division of Occupational Outlook, Bureau of Labor Statistics, U.S. Department of Labor

Robert A. Schaerfl, Director, 1-4.S. Employment Service, U.S. Department of Labor & Designated Federal Official, Advisory Panel for the Dictionary of Occupational Titles

Amiel Sharon, U.S. Office of Personnel Management

David Stevens, Director, Regional Employment Dynamics Center, Robert G. Merrick School of Business, University of Baltimore

James Van Erden, Administrator, Office of Work-Based Learning U.S. Department of Labor

Daniel Weinberg, Chief, Housing and Household Economic Statistics Division, Bureau of the Census, U.S. Department of Commerce

Jim Woods, National Occupational Information Coordinating Committee

Seth. Zinman, Associate Solicitor for Division of Legislation and Legal Counsel, Office of the Solicitor, U.S. Department of Labor

Individuals Stating Public Comments at and/or Submitting Written Comments for APDOT Public Meetings

Janelle Bjorlie-Ellis, National Rehabilitation Association & Vocational Evaluation and Work Adjustment Association

John R. Feldheim, Director of Disability and Medicare Operations, United States of America Railroad Retirement Board

Sidney A. Fine, Ph.D.

Pamela Frugoli, OIS Specialist, National Occupational Information Coordinating Committee

Gale Gibson, President, VERTEK

Charles T. Hall, Attorney at Law, Hall & Joneth, P.C.

John R. Isaac, Vocational Rehabilitation Specialist

Jerry Lewis, Executive Director, Governor's Council on Vocational Education, Alaska

Marilyn Maze, President, The Vocational Resource

Milan Moravec, Moravec and Associates

Joe Murphy, Office of Disability, Social Security Administration, U.S. Department of Health and Human Services

Deborah Nolte, VEWAA Long Range Planning Task Force, Chair and President-Elect, Vocational Evaluation and Work Adjustment Association

Charles Peters, International Organizer, Sheet Metal Workers International Association

Dale Prediger, Ph.D., Senior Research Scientist, American College Testing

Pat Reeves, Employers' National Job Service Council

Robert Sherer, President, National Association of State Occupational Information Coordinating Committees

Harold Silverman, Psychologist, Montgomery County Children Services

Irene M. Thorelli, Ph.D., Member of the Society of Industrial and Organizational Psychology (SIOP)

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