Guidelines for the Development, Recognition and Usage of Skill Standards- Texas' Framework for Skill Standards

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INTRODUCTION

The Texas Workforce Investment Council (TWIC) administers the Texas skill standards system. This document is a policy manual to provide common understanding and expectations among all relevant parties on:

a) the historical and legislative context of skill standards development in Texas;
b) the roles of the TWIC and of industry in the development and maintenance of the Texas skill standards system;
c) the policies and process requirements for the development and recognition of skill standards; and
d) the requirements for skill standards: content, elements and format.

Background and Historical Context for a Texas Skill Standards System

Many initiatives led to the establishment of the Texas skill standards system. Texas' interest in the concept of a skill standards system began in 1991 with the introduction of legislation to establish the nonprofit Texas Skills Development Corporation. The purpose of the corporation was to "convene existing industry groups and industry associations to ascertain the skill requirements of occupations in the Texas work force." (Source: "Developing a System of Skill Standards and Certification for the Texas Work Force," Robert Glover, Center for the Study of Human Resources, LBJ School of Public Affairs, UT Austin, January 1993, p. 20 – project conducted under direction of the Director, Workforce Development Division, Texas Department of Commerce.) Although the bill was never enacted into law, the pursuit of a skill standards system continued.

In the following year, the Governor charged the Texas Department of Commerce with creating a skills development program to work with business and industry to establish employability standards. A panel of business, industry and labor representatives was convened and issued a 1993 report, entitled "Report to the Governor: Texas Skills Development Program." The report included recommendations for: setting standards for core (foundation and workplace) skills; marketing the benefits of skill standards and certification; establishing a state board of professional and technical standards to distribute industry-validated curricula and assessments; and instituting a system to measure and certify achievement of skills for students and incumbent workers.

Building on the recommendations from the Texas skills development program report, the tri-agency partnership of the Texas Higher Education Coordinating Board, the Texas Department of Commerce, and the Texas Education Agency took the lead to further research key elements of a skill standards and certification system by funding the Texas Skill Standards Research and Communications Project (TSSRCP) for 1995-1996. As part of its charge, the TSSRCP reviewed national and international literature on skill standards; surveyed Texas employers; conducted focus groups with educators and training providers; and met with skill standards officials in the United States, Canada and Mexico. In their final 1996 report, the TSSRCP identified strengths and weaknesses of national skill standards projects, and of systems in use in other states and countries. Their recommendations included: a skill standards system model, adoption of a common nomenclature and common format for skill standards.

In 1995, the 74th Texas Legislature established the Texas Skill Standards Board (TSSB) as part of the workforce development system under House Bill (HB) 1863. It was an advisory body to the governor and legislature on the development of a statewide system of industry-defined and industry-recognized skill standards for major skilled, sub-baccalaureate occupations that provide strong employment and

earnings opportunities. It was charged with four specific mandates. In 1999, the 75th Legislature amended those mandates with the passage of HB 3431.

In 2015, the 84th Texas Legislature abolished the TSSB and transferred its powers and duties (described above) to the TWIC. The TWIC, established by the Texas Legislature in 1993, has strategic planning and oversight of the Texas workforce system. It is composed of 19 members representing business, labor, education, community-based organizations, and five state agency partners.

Legislative Mandate

The four specific legislative mandates assumed by the TWIC are:

1) validate and recognize nationally established skill standards to guide curriculum development, training, assessment, and certification of workforce skills;
2) convene industry groups to develop skill standards and certification procedures for industries and occupations in which standards have not been established or adopted and recognize the skill standards and certification procedures;
3) review standards developed by other states and nations and enter into agreements for mutual recognition of standards and credentials to enhance portability of skills; and
4) promote the use of standards and credentials among employers.

Role of the Texas Workforce Investment Council

The TWIC does not develop skill standards. HB 1863 explicitly states that the skill standards are defined and recognized by industry.

The role of the TWIC is to facilitate and promote a statewide system of voluntary, industry-developed skill standards. As quality assurance agent, the TWIC establishes the criteria for validating nationally established standards, for developing standards in industries and occupations where no standards currently exist, and for reviewing and recognizing other states' and nations' standards. These criteria reflect the need for skill standards to be accessible to and usable by all stakeholders; specifically, to guide curriculum development, training, assessment and certification of workforce skills. A website repository provides employers, workers, learners, education and training providers, and other interested groups with access to the skill standards. The TWIC also plays a leadership role in convening industry groups to develop the skill standards and in promoting the use of standards among employers.

Creating a system of skill standards requires collaboration among all relevant, interested parties. This document is a primary vehicle to communicate with and establish common understanding among the various partners in workforce development. This document sets out the context in which skill standards are developed and requirements that must be considered by industry groups that intend to seek recognition for those skill standards.

AN OVERVIEW

Skill Standards

> *Skill standards are performance specifications that identify the knowledge and competencies an individual needs to succeed in the workplace. Standards are defined by occupational areas and validated by representatives from the occupation. Standards include the functions, activities and performance criteria for an occupational area.*

Consistent with the mandate and objectives of the TWIC, the purpose of a Texas system of voluntary skill standards is to strengthen the ability of Texas' industry to be competitive in the global economy through the enhancement of workforce skills and organization capabilities. Skill standards provide a base for productivity improvements through enhanced entry-level and incumbent worker skills, and must support true strategic capabilities at the industry and enterprise levels. Skill standards should not only capture current critical work functions and activity skills, but also those work and worker characteristics that will enable enterprises to build competitive capabilities and strategic market placement through effective work practices.

Purpose and Components of these Guidelines

The purpose of these guidelines is to articulate the policy, principles, and broad procedural requirements of the Texas system as they relate to skill standards development, recognition and usage. There are seven essential components of the *Guidelines* that are outlined in this document under the following section: Policies, processes, and related criteria. The components are:

Component 1: Skill Standards Development Considerations outlines considerations in the identification of occupations for the development of industry skill standards, and the principles, processes and requirements for recognition.

Component 2: Skill Standards Development Actions defines the nine essential actions required in the development of skill standards for recognition.

Component 3: Submission for Recognition details the procedural and supporting documentation requirements for submission.

Component 4: Recognition details the specific requirements for recognition and the possible outcomes of consideration for recognition.

Component 5: Storage and Access focuses on storage and access of recognized skill standards and notes pertinent details regarding an agreement by the development group for the storage of the skill standards.

Component 6: Usage notes issues for consideration by stakeholders interested in using recognized skill standards. A number of uses are discussed, and a caveat is noted regarding legal defensibility.

Component 7: Review and Updating discusses issues of skill standards currency and outlines the process and requirements for review and updating of recognized skill standards.

POLICIES, PROCESSES, AND RELATED CRITERIA

COMPONENT 1: Skill Standards Development Considerations

General Requirements for Skill Standards Development

The skill standards development process shall meet the following general criteria:

- **Fair process and inclusivity**: Any organization or person with a direct and material interest has a right to participate in the skill standards development and analysis process. Participation may not be conditional upon membership in any organization, nor unreasonably restricted on the basis of other requirements which may be deemed arbitrary.

- **Balance of interests**: Neither the skill standards development leadership group, called the industry technical advisory committee (ITAC), nor the subject matter experts (SME) shall be dominated by a single interest category. There should be a balance of interests that represent industry interests and organizations within the occupational area of the skill standards under development.

- **Consideration of views and objections in reaching consensus:** The ITAC should consider all views and objections and seek to reach resolution. This consideration and consensus is critical in assuring that the skill standards are acceptable and have support from industry stakeholders.

Job Analysis Methodology

This section sets out principles in relation to skill standards development processes and tools. It provides only an overview of a complex process. Successful skill standards development requires adherence to accepted job analysis methodologies to ensure procedural validity, and content validity and reliability. A work or job analyst must be engaged by the ITAC to conduct the occupational analysis and to synthesize and organize the raw data from that analysis to meet the specific recognition requirements (See job analyst definition in glossary at Appendix A).

> *Job analysis is the systematic and analytic gathering, documenting, and analyzing of information about actions employees take in performing the tasks incumbent to their jobs. That is, analysis deals with information about job content, and job requirement, as well as the context of the entire work organization.*
>
> - Wills, J. 1993. An Overview of Skill Standards Systems in Education and Industry (Vol. 1)

Job analysis methods or techniques are the formal procedures that work and job analysts follow to obtain specific information about the occupation under scrutiny. This process generates information that generally contains specifics on: critical job functions; activities or tasks; tools necessary to perform the job; conditions under which the job must be performed; knowledge and skills that the worker must possess to competently undertake the job functions; and indicators of successful performance.

There are a number of job analysis techniques that are suitable for gathering raw data that may then be organized as skill standards for possible recognition. Literature that documents comparative analyses of job analysis methods suggests there is no one best method. All have strengths, limitations and varying degrees of suitability. However, a number of job analysis procedures developed by researchers over the

past 40 years have been recognized as notable. Although the following list is not exhaustive, some of those methods include:

- Functional Job Analysis as developed by Sydney Fine;
- Critical Incident Technique as developed by John Flanders;
- Position Analysis Questionnaire as developed by Ernest McCormack & Associate at Purdue University;
- DACUM (Developing a Curriculum), including modified DACUM, as refined by Dr. R. Norton at Ohio State University; and
- Job-Task Inventory ((CODAP) and the Extended Search) as developed by Dr. R. Crystal for the U.S. Air Force.

The selected job analysis method must substantiate procedural and content validity and demonstrate formal structure, rigor, and job relatedness through the collection of work-oriented and worker-oriented data and related knowledge and skills. The chosen method must include the participation of SMEs in the generation and validation of data, and must not contravene any legal requirements.

Specific Job Analysis Requirements

In addition to the general requirements previously noted, the following specific criteria will also be used in the evaluation of skill standards submitted for recognition. The resulting skill standards must meet the following criteria with regard to process and job analysis method:

- The job analysis process is procedurally valid in that it engages appropriate occupational SMEs, management, labor, job incumbents, licensing or certification agents if applicable, and other interested stakeholders in the development of the skill standards.

- The stakeholders engaged in the job analysis process are representative of the broad occupational base for which the skill standards are being developed with regard to organization size and geographic and demographic diversity.

- The analysis method uses a process that identifies both work- and worker-oriented information, and the delineation of a level of performance at which the worker is deemed to be competent by industry standards.

- The work-oriented elements of the skill standards resulting from the job analysis are subjected to a rigorous Texas industry-wide validation process to ensure content validity.

- The skill standards do not contravene any applicable federal, state or local statutes, including the Equal Employment Opportunity Act and the Americans with Disabilities Act. The skill standards shall reflect the critical functions that are occupation-related and consistent with business requirements.

COMPONENT 2: Skill Standards Development Actions

Nine Essential Actions in Skill Standards Development

There are nine essential actions to be undertaken in the development of Texas skill standards. These actions include a number of general and specific requirements in relation to skill standards development. These actions, if followed, will assist in the development of skill standards that are likely to meet the requirements of the TWIC for recognition. However the sequence of the actions, which are detailed below, is a general guideline only. For detailed procedures and criteria related to skill standards development for TWIC recognition, see *Developing Skill Standards - A User's Guide (A Guide for Texas Industry Groups Developing Skill Standards for Recognition by the Texas Workforce Investment Council).*

Action 1: Identify the Occupation and Review Resources for Relevant Information

An essential first step in the development of skill standards is the decision of what occupation the development effort will focus on, and in what industry sector the occupation belongs. Further, a determination of what skill standards and skill standards information exist at the state and national levels is essential as it will provide both a base and a context for Texas development efforts. The primary consideration in this step is the determination of the target occupation for skill standards identification and development. Two fundamental principles in this determination are that the target occupation must: 1) be representative of a broad-based occupation, encompassing a number of Standard Occupational Classification (SOC) job titles and associated codes; and 2) have industry wide significance and contribute, or will contribute, significantly to the health of the Texas economy.

In determining the target occupation, a review of relevant occupational data is recommended. While anecdotal evidence may be useful in helping to identify an occupation, the use of quantifiable industry occupational and labor market data is strongly suggested. This review will assist partnerships in identifying occupations that might be considered priorities in the economic competitiveness of Texas given factors such as high growth, skill shortages and/or an emerging industrial base.

Texas skill standards are defined within 15 industry sectors. Those sectors, listed below, are based on the North American Industrial Classification System (or NAICS). Further definition for each sector may be found in the Glossary.

Industry sectors for skill standards classification:

1. Agriculture, forestry and fishing
2. Business and administrative services
3. Construction
4. Education and training
5. Finance and insurance
6. Health and human services
7. Manufacturing, installation and repair
8. Mining
9. Public administration, legal and protective services
10. Restaurants, lodging, hospitality and tourism, and amusement and recreation
11. Retail trade, wholesale trade, real estate and personal services

12. Scientific and technical services
13. Telecommunications, computers, arts and entertainment, and information
14. Transportation
15. Utilities and environmental and waste management

There are a number of sources of information, including occupational data and market indicators, which may assist in identification of the occupational area:

- Texas Workforce Commission data including: SOCRATES; labor market indicators such as current number of workers in occupation; projected growth; replacement jobs projected and total projected job openings; and wage/earning indicators;
- Market shifts identified by changes in Texas' gross state product;
- Broad industry consensus and recommendation;
- Other sources of data and empirical evidence;
- Other skill standards projects at either the state or national level; and
- State and/or local workforce development efforts.

Action 2: Convene the Industry Technical Advisory Committee

The group charged with leadership of the skill standards development process is called the ITAC. The function of this group is to drive the skill standards development process through the provision of guidance, advice, and technical knowledge. The ITAC is the group that recommends the developed standards to the TWIC for recognition, and is responsible for updating the skill standards.

The ITAC is a critical component in the achievement of procedural validity required for skill standards recognition. The composition of this group is required to have industry as the majority voice, and should reflect the composition of employers in Texas within the industry/occupation by:

- size of company (as defined by numbers of employees);
- region (as defined by geographic location); and
- business diversity (as defined by primary business function).

Additionally, it is strongly suggested that where there is labor involvement within the occupation that there is representation on the ITAC. The same suggestion is applicable where there is a credentialing or licensing group/authority connected to an occupation under analysis. Further, there should be two education and training provider representatives, chosen if possible from those considered best-practice in the delivery of training for the occupation under analysis.

Examples of ways that an ITAC might be assembled, include:

- facilitated by an educational institution such as a community or technical college funded through a Texas Higher Education Coordinating Board Perkins leadership grant or local funds; and
- organized by a group of employers across an industry who are collaborating to increase the pool of qualified labor for their occupational area through skill standards development.

If an industry group is interested in developing skill standards for an occupation, it is strongly advised that the group contact the TWIC prior to convening an ITAC to determine whether or not any

skill standards development efforts are occurring, either in Texas or nationally. To minimize the possibility of duplication of effort, all ITACs are required to submit a notification of intent to develop skill standards (NOI) form.

Notification of intent to develop skill standards

ITACs that convene to develop skill standards with the intention of submitting those standards for recognition, shall file a NOI form. It is advisable that the industry group notify the TWIC as soon as possible after convening, so that staff is aware of development efforts, and can therefore provide technical assistance and advice as needed. In the event that skill standards have been developed previously (defined for the purpose of this criteria as within the previous 36 months prior to the date of skill standards submission) by an industry group, and that group wishes to submit the skill standards for recognition, no notification of intent is required. The group may begin the submission process at the point of application for recognition. In this situation, all recognition criteria must still be met.

Action 3: Determine Existing Information Sources Pertinent to the Proposed Skill Standards Development Effort

The gathering of information on existing skill standards in the target occupation and examples of best practice and high performance workplaces will provide a base of knowledge and understanding from which to commence a skill standards development effort. This information is critical in determining the array of job titles that may fit within the occupation under consideration. Additionally, existing information may assist in the preliminary identification of major areas of job responsibility and critical work functions. Some sources of existing occupational information include:

- military job analyses;
- research and other published job analyses;
- published job analysis comparative studies;
- national labor market databases;
- U.S. skill standards projects at either the state or national level;
- international job analyses or skill standards; and
- proprietary job analysis data from commercial providers.

Prior to completion of this action in the development process it is suggested that preliminary assumptions regarding the standards be generated. These assumptions may be used to assist in defining the following action to determine the plan, method of analysis and strategy for validation of the standards. Assumptions will be further defined prior to submittal of the standards and recorded on the assumptions related to the standard form.

Action 4: Determine the Project Plan, Method of Job Analysis and Strategy for Content Validation

Project planning and method of job analysis

In this critical planning phase, the ITAC shall determine the project plan, resource requirements, timelines for completion of tasks, and the specific project outcomes and products. Also at this time the job analysis method that will be used to generate the data from which the skill standards will be derived should be determined. The use of any particular job analysis method is neither recommended nor required. Regardless of the method used, the end result shall meet the criteria noted in the sections *Job Analysis Methodology* and *Specific Job Analysis Requirements.* This planning and subsequent documentation of the process is critical in demonstrating procedural validity and in assisting to establish content validity.

Strategy for content validation

In selecting a strategy to validate skill standards content, consideration must be given to the method of validation and sampling strategy. Content validity may be established through focus groups, survey and/or other means, and should specifically focus on the work-oriented skill standards elements rather than the raw job analysis data. Whatever strategy is chosen, the population of respondents sampled must be representative of the occupation for which skill standards are being developed.

Action 5: Develop Work-Oriented Information

The first round of data collection focuses on work-oriented information. Skill standards specify what a worker needs to know and do on the job, as well as the level of performance required to demonstrate competence in that knowledge and skill. Both work- and worker-oriented information are essential pieces of meaningful skill standards. The three skill standards elements of work-oriented information include:

- critical work functions,
- key activities, and
- performance criteria.

The inclusion of work content information is critical in the establishment of performance standards and the translation of skill standards into relevant training and education programs.
Work-related information and context require that the following issues be considered during the skill standards development phase.

Critical work functions and key activities - Criticality versus level of specificity:

Critical work functions should be defined at a meaningful level that is representative of a major job function that is non-trivial and neither too large nor too small in its scope of work. Following this, the key activities that are associated with each critical work function should be units of work (task cluster rather than a list of specific tasks) that are necessary to perform the critical work function. Both critical work functions and key activities should include enough specific occupational work context to be meaningful for differentiation of skill sets and work content.

As a general range, 10 to 15 critical work functions are usually sufficient to describe the key functions and duties associated with an occupation that relate to the achievement of the key purpose of the occupation. Within each critical work function, there are usually from three to six key activities necessary to perform that function. These ranges are provided as benchmarks rather than rules. National and international experience would suggest that a total of 30 to 90 key activities are generally of a sufficient number to allow the occupation to be described in significant breadth and depth.

Performance criteria - Specific information:

To support these critical functions and key activities, performance criteria should clearly specify the type, quality, and level of output (demonstrable behavior or product) required to successfully perform each key activity of a critical work function. The goal of performance criteria is to provide benchmarks against which skills and knowledge can be meaningfully evaluated. Performance criteria should support the development of training curricula and assessment.

Note: The fourth skill standards element, the worker-oriented occupational knowledge, skills and conditions, may also be collected during this round or during the second round of data collection, described below. The decision will be dependent upon the type of job task analysis methodology that is used.

Action 6: Develop Worker-Oriented Information

The second round of data collection focuses on worker-oriented information. As previously noted, both work- and worker-oriented information are essential pieces of meaningful skill standards. While work-oriented information is critical in conveying the requirements of the job, worker-oriented information details the underlying academic and employability knowledge and skills, as well as the occupational context in which work is undertaken and the conditions under which performance will be judged as competent. Worker-oriented information is critical in conveying the skills and knowledge required for effective performance of critical work functions and related key activities. The three skill standard elements of worker-oriented information include:

- academic knowledge and skills;
- employability knowledge and skills; and
- occupational knowledge, skills and conditions.

Academic knowledge and skills - The knowledge and skills most usually associated with traditional subject areas, such as reading, writing, mathematics, science, etc., defined in terms and levels that are relevant to the world of work.

Employability knowledge and skills - The applied knowledge and skills required for effective performance across a range of occupations. These skills and knowledge are sometimes referred to as transferable or cross-functional skills and knowledge.

Occupational knowledge, skills and conditions - The technical or occupational-specific knowledge and skills required to carry out processes or procedures common and critical to the related key activity, and the conditions necessary to carry out the related key activity. Conditions include the tools, resources and equipment necessary to carry out the related key activity and its performance criteria. If not collected in concert with the work-oriented information, the occupational knowledge, skills and conditions should be generated during this second round of data collection.

The inclusion of worker-oriented information is critical in defining the whole universe of skills and knowledge required to successfully perform a critical work function and related key activities. This worker-oriented information assists in the construction of relevant training curricula and instruction methods. There are a number of commercial and public domain tools and taxonomies that define worker-oriented information by a predetermined set of skills, knowledge and abilities. All models seek to achieve the same outcome: identify skills, knowledge and abilities according to the taxonomy specified in the model. This does not mean that one model or taxonomy is more or less appropriate than another. However, there may be a need for translation and reconciliation of worker-oriented information based on the taxonomy used, and the required Texas skill standards elements, ratings and format.

Academic and employability knowledge and skills process

While the work-oriented elements of the standards identify what needs to be done on the job, the worker-oriented elements define the knowledge and skills that someone must possess in order to fulfill the defined responsibilities. It is important to recognize that it is not possible to develop academic and employability knowledge and skills (AEKS) information until such time as the work-oriented (action 5) information has been collected and validated.

The Texas skill standards elements and format were designed to facilitate portability of credentials and transferability of individuals' skills, and thus promoting the linkage of state and national skill standards efforts. As part of the skill standards elements required for recognition, Texas adopted the common nomenclature and the AEKS endorsed by the National Skill Standards Board[1] (NSSB).

These *Guidelines* provide procedural requirements regarding the collection of AEKS data. The *Skill Scales Companion Guide* defines the seventeen (17) AEKS and associated rating scales to determine the levels required on the job. The ITAC will be provided with procedural requirements and the skill scales instrument prior to commencing the skill standards development process.

Action 7: Analyze, Synthesize, and Validate Data

The job analysis process of determining work- and worker-oriented information does not result in skill standards. The raw data gathered in the job analysis process must be transformed into skill standards. Analysis, synthesis and organization of data occur at two points: first, after collection of work-oriented data and second, during the process of collecting worker-oriented data.

This step of the development process takes the raw data from the previous two steps and organizes it into a common skill standards framework. It is critical that all recognized skill standards use this framework in order to allow a systematic conversion of the standards into training and educational programs. This framework allows training and educational providers to easily convert the standards into curricula. Thus, this step is critical in making the data usable for stakeholders, and for the development of curricula and assessment instruments. In turn the curricula and assessment tools are the foundations for a system of certification and credentials.

[1] The National Skill Standards Board (NSSB) no longer exists. However, skill standards recognized in Texas that were developed by the NSSB's voluntary partnerships are still valid. The AEKS and accompanying *Skill Scales Companion Guide* adopted for the Texas system were developed by the NSSB.

Analyze and synthesize

Work-oriented information may be developed using a myriad of different approaches. The analysis and synthesis of work-oriented data focuses on interpreting and organizing the raw data gathered in the job analysis. If the raw data from the job analysis has not already been aggregated into meaningful units of work called key activities and organized into critical work functions, this is the step at which this analysis and synthesis occurs. The work-oriented data is then ready for validation and entering into the required format.

Worker-oriented information need not undergo a separate analysis and synthesis step. The required AEKS procedure and use of the accompanying *Skill Scales Companion Guide* ensures that worker-oriented information has been through analysis and synthesis during the data collection process.

Validate work-oriented data

Work-oriented information must be validated in accordance with the job analysis strategy chosen. There are numerous approaches to data validation. However, at its most fundamental, validation is a process through which the ITAC provides confidence that the standards accurately represent the work described by the standards. The focus of this validation effort must be on content validity. Professional standards related to validation include the *Standards for Educational and Psychological Tests* (developed jointly by the American Psychological Association, the American Educational Research Association and the National Council on Measurement in Education) and the *Principles for the Validation and Use of Employee Selection Procedures* (developed by the Society for Industrial and Organizational Psychology).

Key considerations regarding validation include:

- The occupational scope of the skill standards, and
- The composition of the ITAC.

Procedural requirements related to work-oriented (round 1) and worker-oriented (round 2) data collection:

- Qualifications of the SMEs;
- The information being validated; and
- The process that will be implemented, including SME sampling.

Action 8: Construct Statements of Assessment

The seventh and final skill standards element is the statement of assessment. A statement of assessment is the guide to appropriate strategies and tools to be used to assess the level of skill attainment in a critical work function.

A statement of assessment should be defined for each critical work function. The statement may be broad, or may recommend specific strategies and tools. It may include information regarding the relative importance of the critical work function, with associated key activities and performance criteria, in relation to other critical work functions in terms of time spent on the job (or in training) and weighted assessment. Where the skill standards contain occupational information from a cluster or hierarchy of jobs, the statement of assessment may also indicate which key activities should be assessed at various experience levels in the workplace. This provides industry the opportunity to

differentiate key activities at entry, intermediate and advanced experience levels. However, this differentiation is not a requirement, but is strongly suggested if the skill standards work- and worker-oriented information is at a level higher than entry level.

At the end of this final step in the development process, it is necessary to document any assumptions that are pertinent to the interpretation and/or use of the skill standards by stakeholders. These assumptions are to be recorded on the assumptions related to the standards form (see appendix D in the TWIC publication, *Developing Skill Standards: A User's Guide* located on the Texas skill standards website at: www.tssb.org/publications-2). Assumptions should be clearly articulated, so that any individual not involved with the development effort is capable of following the logic associated with the decisions that were made to generate the standards. Additionally, this data is important to determine how the standards can be translated into education and training programs.

Action 9: Organize Data - Skill Standards: Elements and Format

The job analysis data compiled during the development process, and subsequently analyzed and synthesized, must be organized under the seven elements that comprise skill standards. The seven elements that comprise skill standards are:

- critical work functions;
- key activities;
- performance criteria;
- academic knowledge and skills;
- employability knowledge and skills;
- occupational knowledge, skills and conditions; and
- statements of assessment.

During this organization step all work- and worker-oriented information is arranged into the skill standards elements in the required format. The primary purpose of this step is to ensure that the work-oriented information is organized and that it logically connects to the worker-oriented information.

Developers should use the Texas skill standards format template, available from TWIC staff, to organize the data in the required format.

COMPONENT 3: Submission for Recognition

To be considered for recognition, the application for skill standards recognition shall meet the following submission requirements. All application forms indicated here are available on the Texas skill standards website at www.tssb.org/applications. These requirements may be considered an evaluation checklist for reviewers.

Submission Requirements:

1. **Notification of Intent to Develop Skill Standards -**
   A copy of the ITAC's original NOI shall be included in the application package.

2. **Application for Recognition of Skill Standards -**
   ITAC or other industry stakeholder groups requesting recognition shall complete and submit to the TWIC office an application packet. The application shall be submitted under the signature of the chair, indicating endorsement of the skill standards on behalf of the ITAC. The application packet consists of the documentation listed below.

   - ***Skill standards*** - One electronic copy of the skill standards being considered for recognition. The electronic copy of the skill standards shall meet all recognition criteria, including elements and format. (See *Criteria for Recognition* section in these guidelines.)

   - ***Rationale for selection of occupational area*** - Brief summary of the rationale for selection of the target occupational area, including: title and key purpose; list of related SOC job titles and codes; linkage to a Texas skill standards industry sector; and explanation of the occupational area's importance to the economic competitiveness of the State of Texas, supported by specific labor market data.

   - ***Assumptions related to the standards*** - Any underlying assumptions determined by the ITAC to pertain across the skill standards statements for the specific occupational area.

   - ***Composition of ITAC*** - A list of ITAC members and their affiliations with an explanation that the group is industry dominated and is representative of the composition of employers within the industry or occupational area by size of company, geographic location in the state, and business diversity, as indicated in the section, *Component 1: Skill Standards Development*.

   - ***Description of skill standards development process*** - A description of the procedural steps undertaken to develop the skill standards, including the job analysis method used to generate the raw data, and the validation strategy used to ensure the resulting skill standards are valid and reliable.

   - ***Review and update agreement*** - A statement of commitment from the ITAC to regularly review and, if necessary, update the skill standards and to submit any updates to the TWIC.

   - ***Public access and storage*** - Consent that the skill standards will be posted in the public domain and will be available on the Texas skill standards website where they will be accessible to all interested parties and stakeholders.

3. **Agreement to Meet with TWIC Representative -**
   A representative of the ITAC shall agree to be available, as needed, to meet with a representative of the TWIC prior to formal consideration of the submitted skill standards.

COMPONENT 4: Recognition

Skill standards submitted for recognition by an ITAC or other industry stakeholder group as previously noted in this document will be evaluated on the basis of both the application packet and skill standards documentation submitted, in the context of the policies and principles stated in these guidelines. The following criteria will be considered in determining recognition:

1. **Development Process** –
   The skill standards shall be formally defined and recognized by a representative group of employers and workers within an industry or occupation, using a procedurally valid development process, have content validity, and shall comply with all civil rights laws and other applicable statutes, as specified under the section titled, *Component 1: Skill Standards Development.*

2. **Skill Standards -**
   The skill standards shall have information organized under the seven elements and be presented in the required format.

3. **Application for Recognition** –
   The ITAC or other industry stakeholder group shall follow all the procedural and substantive requirements for submission of skill standards for recognition, as specified under *Component 3: Submission for Recognition*, including the application for recognition, which consists of the following documentation:

   - Skill standards;
   - Rationale for selection of occupational area;
   - Assumptions related to the standards;
   - Composition of ITAC;
   - Description of skill standards development process;
   - Public access and storage; and
   - Review and update agreement

Categories of Recognition

A category of recognition will be determined and awarded based on an assessment of how well the skill standards meet the recognition criteria. Recognition may be denied in the event that the skill standards do not meet all of the recognition criteria. Where there are specific deficiencies, TWIC staff will offer feedback on the skill standards and work with the ITAC or industry group to develop a plan to resubmit the skill standards that ensures all recognition criteria are met. There are two possible recognition outcomes of the skill standards assessment:

- **Recognized**

This recognition is awarded to skill standards that meet all criteria for recognition and have been submitted by a Texas industry group that provides evidence of a Texas-wide development and validation process.

- **Conditionally Recognized**

This recognition is awarded to skill standards submitted for recognition by an industry or stakeholder group that provides evidence of a rigorous development and validation process that took place somewhere other than in the state of Texas. Industry or stakeholder groups may include:

- a national industry group which is recognized by its constituent industry/business base;
- a U.S. state's skill standards recognition authority; and
- a foreign country's skill standards recognition authority.

COMPONENT 5: Storage and Access

The Texas Skill Standards Repository

All recognized skill standards are maintained in a website repository at www.tssb.org/texas-skill-standards-repository. This website page provides interested stakeholders with access to and information on recognized skill standards. The ITACs that originated the skill standards also play a critical role in the maintenance of the standards. They agree that the recognized skill standards will be posted in the public domain on the website. The ITACs also agree to review, and update the standards as necessary, to ensure continued currency and relevance.

COMPONENT 6: Usage

Training and Educational Purposes

Skill standards recognized in Texas are an effective tool for industry to communicate their workforce requirements to education and training providers. The Texas Legislature intended the skill standards to "guide curriculum development, assessment, and certification of workforce skills." The skill standards elements of work- and worker-oriented information, including performance specifications, provide community and technical colleges and other training providers with industry skill requirements for the development of both curricula and assessments in workforce education programs.

Usage focuses on the translation of recognized skill standards into skill-based training and education programs (See the companion guide to this document, the *Guidelines for Texas Skill Standards Based Program Recognition*, for more detailed information and suggestions for developing curricula based on skill standards). The role of the TWIC is to bridge the gap between industry skill standards and their usage by education and training providers to prepare students and trainees for the workforce. Within Texas' voluntary skill standards system, the TWIC has no authority to compel education and training providers to use the standards. Rather, its charge is to promote the use of standards and credentials among employers. The role of industry, in turn, to communicate with training and education providers and to express the need for the use of the recognized skill standards in the curriculum development process. Additionally, the hiring of graduates by industry will act as a market mechanism to leverage education and training providers to utilize skill standards in program development.

Broad versus Enterprise Specific Uses

The recognition of skill standards is predicated on the supposition that the skill standards have broad applicability and relevance across a Texas occupation. For this reason, it may not be applicable or desirable to use recognized skill standards at the individual enterprise or company level for any purpose other than education and training.

Legal Defensibility Issues

While skill standards have a multiplicity of uses, there are legal considerations and limitations to those uses. In the event that an enterprise, business or corporation desires to use recognized skill standards for any reason other than an education and training purpose, it is imperative that the skill standards be internally validated by the company through rigorous and documented validation processes. The TWIC recognized skill standards may serve as the basis for company skill standards, but the standards must be deemed to be internally valid and reliable by a particular company prior to use in employee selection, promotion or other processes.

The skill standards, including critical work functions, key activities and performance criteria, must not contravene any applicable federal, state or local statutes, including the Equal Employment Opportunity Act and the Americans with Disabilities Act. The skill standards must reflect actual work requirements and be consistent with business requirements.

Caveat

The TWIC does not recommend or endorse the use of skill standards for purposes other than education, training and related career information.

COMPONENT 7: Review and Updating

Skill Standards Currency

Skill standards may become obsolete over time due to changes in the skills required in an occupation as technology and business requirements change. As industry and occupations change substantially, so must skill standards. The more change an industry or occupation experiences, the more often skill standards will need to be reviewed and updated to ensure that they reflect industry requirements.

As a general rule, skill standards should be reviewed and updated every three to five years. Industries and occupations that experience rapid change may need to review and update their standards on a more frequent basis. All recognized skill standards must be reviewed and updated by an industry advisory group when there are substantive changes to the work-oriented information.

The application package requesting skill standards recognition contains a statement of agreement to review, and as necessary update, the skill standards and submit any updates to the TWIC. The statement of agreement must be signed, on behalf of the ITAC or industry group, by its chair.

Processes for Keeping Skill Standards Current

Where the ITAC review reveals that there has been sufficient change in the critical work functions, key activities and/or performance criteria of the occupation to warrant a revision of the skill standards, the revised skill standards must be validated by industry and submitted to the TWIC in compliance with all submission and recognition requirements.

Skill standards may be amended at any time when the occupational skills, knowledge, and conditions (skills, tools, resources and equipment necessary to carry out the key activities and their related performance criteria) change but not the actual work performed (the critical work functions, key activities and performance criteria).

The submission of amended skill standards for recognition must be accompanied by an application package noting that the submission is an amendment. In the section *Assumptions Related to the Standards* the specific points of change within the standards must be noted by the key activity number. In no instance should any other change be made to the standards other than in the *Occupational Skills, Knowledge, and Conditions* elements.

In the event that a quorum of the original ITAC membership is unable to re-convene for this purpose, another industry partnership may convene for the purposes of skill standards amendment or review and update.

Appendix A

GLOSSARY

Academic knowledge and skills - The knowledge and skills most usually associated with traditional subject areas, such as reading, writing, mathematics, science, etc., defined in terms and levels that are relevant to the world of work.

> **Academic knowledge and skills nomenclature** (used by permission from the National Skill Standards Board)**:**
>
> **Mathematics** - Understand, interpret, and manipulate numeric or symbolic information; solve problems by selecting and applying appropriate quantitative methods, such as arithmetic, quantitative reasoning, estimation, measurement, probability, statistics, algebra, geometry, and trigonometry.
>
> **Reading** - Understand and make use of written information that may be presented in a variety of formats, such as text, tables, lists, figures, and diagrams; and select reading strategies appropriate to the purpose such as skimming for highlights, reading for detail, reading for meaning, and critical analysis.
>
> **Science** - Understand and apply the basic principles of the physical, chemical, biological, and behavioral sciences; understand and apply the scientific method, including formulating and stating hypotheses and evaluating them by experimentation or observation.
>
> **Writing** - Express ideas and information in written form clearly, succinctly, accurately, and in an organized manner; use English language conventions of spelling, punctuation, grammar, and sentence and paragraph structure; and tailor written communication to the intended purpose and audience.

Assessment - A process of gathering information to meet a broad range of evaluation needs. Specifically, in relation to skill standards, assessment is the process used to evaluate performance to determine whether it meets the level of competence specified in the skill standards. Assessment instruments to measure competency can include paper-and-pencil or computer-administered tests, simulations, demonstrations, assessment centers, work samples, portfolios, interviews, and others.

Benchmark - Something that serves as a standard against which to aim and against which to be measured. In the context of these guidelines, the term “high-performance benchmarks” refers to establishing skill standards that reflect standards of performance required in high-performance workplaces.

Certification - The process by which a non-governmental agency, association or industry group grants recognition of competence to an individual who has met predetermined qualifications or performance standards specified by the agency, association or industry group.

Competency - A major skill or ability needed to perform effectively and efficiently in the workplace.

Content validity - Content validity refers to the extent to which the data derived from the job analysis

process accurately reflects and is representative of the actual requirements of the job or occupation. Content validity is established through a formal validation strategy using the sampling of incumbent workers' feedback by one or more different means.

Credentialing - The process by which an accredited institution or association grants recognition of technical competence. The credentialing process may require registration, certification, licensure, or professional association membership. The official document that serves as evidence of this process is often referred to as a credential. (Often used synonymously with certification.)

Critical work functions - The principal responsibilities that must be performed by workers to meet the key purpose of the occupational area. These units of work are significant and non-trivial. As a general guide, an occupation may be described using no more than 10 to 15 critical work functions.

Employability knowledge and skills - The applied skills and knowledge required for effective performance across a range of occupations. These skills and knowledge are sometimes referred to as transferable or cross-functional skills and knowledge.

> **Employability knowledge and skills nomenclature** (used by permission from the National Skill Standards Board)**:**
>
> **Adaptability** - Change one's own behavior or work methods to adjust to other people or to changing situations or work demands; be receptive to new information, ideas, or strategies to achieve goals.
>
> **Analyzing and solving problems** - Anticipate or identify problems and their causes; develop and analyze potential solutions or improvements using rational/logical processes or innovative and creative approaches when needed.
>
> **Building consensus** - Build consensus among individuals or groups by: facilitating agreements that involve sharing or exchanging resources or resolving differences in such a way as to promote mutual goals and interests; persuading others to change their point of view or behavior without losing their future support; and resolving conflicts, confrontations, and disagreements while maintaining productive working relationships.
>
> **Gathering and analyzing information** - Obtain facts, information, or data relevant to a particular problem, question, or issue through observation of events or situations, discussion with others, research, or retrieval from written or electronic sources; organize, integrate, analyze, and evaluate information.
>
> **Leading others** - Motivate, inspire and influence others toward effective individual or team work performance, goal attainment, and personal learning and development by serving as a mentor, coach, and role model, and by providing feedback and recognition/rewards.
>
> **Listening** - Attend to, receive, and correctly interpret verbal communications and directions through cues such as the content and context of the message and the tone and "body language" of the speaker.
>
> **Making decisions and judgments** - Make decisions that consider relevant facts and information, potential risks and benefits, and short- and long-term consequences of alternatives.

Organizing and planning - Organize and structure work for effective performance and goal attainment; set and balance priorities; anticipate obstacles; formulate plans consistent with available human, financial, and physical resources; and modify plans or adjust priorities given changing goals or conditions.

Self and career development - Identify own work and career interests, strengths, and limitations, and pursue education, training, feedback, or other opportunities for learning and development; manage, direct, and monitor one's own learning and development.

Speaking - Express ideas and facts orally in a clear and understandable manner that sustains listener attention and interest; tailor oral communication to the intended purpose and audience.

Using information and communications technology - Select, access, and use necessary information, data, and communications-related technologies, such as basic personal computer applications, telecommunications equipment, Internet, electronic calculators, voice mail, electronic mail, facsimile, and copying equipment, to accomplish work activities.

Using social skills - Interact with others in ways that are friendly, courteous, and tactful, and that demonstrate respect for individual and cultural differences, and for the attitudes and feelings of others.

Working in teams - Work cooperatively and collaboratively with others to achieve goals by sharing or integrating ideas, knowledge, skills, information, support, resources, responsibility, and recognition.

Incumbent worker - A worker who currently occupies or performs a job that is encompassed within the occupational area being analyzed for skill standards development.

Industry sectors - Broad groupings of industries which, taken together, constitute the entire scope of economic effort and employment in the state of Texas. The following 15 industry sectors, used to categorize skill standards occupational areas, are based on the North American Industrial Classification System (NAICS).

Agriculture, forestry, and fishing - Crop production; animal production; veterinary services; forestry and logging; fishing, hunting, and trapping; landscaping.

Business and administrative services - Human resources; employment services (including personnel supply, employment placement and leasing); management consulting services; marketing research and public opinion polling; services to buildings and facilities support services; accounting, tax preparation, bookkeeping and payroll services; administrative and support services (including secretarial, telephone, mailing, etc.); other business services (including event planning, etc.).

Construction - Building, developing, and general contracting (including residential and nonresidential); heavy construction (including highways, bridges, tunnels, pipelines, industrial non-building construction, etc.); special trade contractors (including plumbing, heating, air conditioning, electricians, carpenters, painting, roofing, etc.).

Education and training - Child care and preschool; elementary education; secondary education;

postsecondary education; job training, vocational rehabilitation.

Finance and insurance - Credit intermediation (including banking, savings and credit union institutions, credit cards and sales, financing, consumer lending, mortgage and loan brokering, trade financing, secondary market financing, etc.); securities, commodity contracts, and related activities; credit bureaus and collection agencies; insurance and employee benefit funds (including pension funds); funds, trusts, and related activities; public finance; administration of government economic programs.

Health and human services - Ambulatory health care services; hospitals; nursing and residential care facilities; human services and social assistance (including elderly and disabled services, children and youth services, community and housing, emergency relief, etc.); administration of government human services programs.

Manufacturing, installation and repair - Food and beverages; textiles, textile products, apparel, and leather; furniture; wood and paper; printing; petroleum and coal products; chemicals; plastics and rubber products; non-metallic minerals, including glass, concrete, etc.; primary and fabricated metals; machinery; computers and electronics products; electrical equipment and appliances; transportation equipment; installation, repair, and contract maintenance.

Mining - Oil and gas extraction; other mining.

Public administration, legal and protective services - Executive, legislative and general government administration (federal, state, and local); legal services; justice, public order, and safety programs (federal, state, and local); investigation and security services (including security guards and private investigators).

Restaurants, lodging, hospitality and tourism, and amusement and recreation - Restaurants and drinking places; hotels and motels; travel services; tourism services (including sightseeing transportation); amusement and recreation.

Retail trade, wholesale trade, real estate and personal services - Retail trade except restaurants; non-store retailing; wholesale trade; rental and leasing services; real estate; personal services (including beauticians, laundry, and private household services).

Scientific and technical services - Scientific research and development services; architectural, engineering and related services; administration of government housing, urban planning, and community development programs; space programs; national security and international affairs.

Telecommunications, computers, arts and entertainment, and information -
Telecommunications; computers and computer services; motion pictures and sound recording; TV and radio broadcasting; arts and entertainment; specialized design services; photographic services; advertising; publishing; information services, including news services and libraries.

Transportation - Air, rail, water, trucking, transit and ground passenger; pipelines; transportation support activities; postal service; couriers and messengers.

Utilities and environmental and waste management - Electric power; natural gas distribution;

water, sewage, and other systems; waste management and remediation, environmental consulting services; administration of government environmental quality programs.

Industry technical advisory committee (ITAC) - Technical term used by the TWIC to refer to the industry group responsible for oversight of the skill standards development process. The functions of this group are: to provide guidance, advice, and technical knowledge; to recommend the developed standards for recognition; and to review and update the skill standards.

Job analysis - The systematic gathering, documenting, and analyzing of information about actions employees take in performing the tasks incumbent to their jobs. Analysis deals with information about job content, and job requirement, as well as the context of the entire work organization.

Job or work analyst - An individual trained in, and experienced and skilled at, conducting job/work analysis by accepted methodologies.

Key activities - The major duties (or clusters of tasks) that must be performed by workers to accomplish each critical work function. As a general guide, each critical work function may be described using no more than 3 to 6 key activities.

Key purpose - A statement summarizing the essential work-related goal of an occupational area.

Occupational area - Clusters of related jobs across an industry or industries. The occupational area must be stated as part of the skill standards application package, along with examples of job titles which are encompassed within the occupational area.

Occupational skills, knowledge and conditions - The technical or occupational specific skills and knowledge required to carry out processes or procedures common and critical to the related key activity, and the conditions necessary to carry out the related key activity. Conditions include the tools, resources and equipment necessary to carry out the related key activity and its performance criteria.

Performance criteria - Criteria that describe when each key activity has been performed to the level required for workplace success. Performance criteria clearly identify the type, quality and level of output required (standards) to perform the key activities. The focus of performance criteria is on demonstration of the key activity and the outputs and/or outcomes of that behavior.

Procedural validity - In the context of these guidelines, procedural validity refers to the degree to which the skill standards development process, including the job analysis, adheres to the development requirements and that the constitution of the ITAC is representative and inclusive of the employers and stakeholders in the occupational area as required. Procedural validity is demonstrated through the formal documentation of the skill standards development process steps.

Reliability - In the context of these guidelines, reliability refers to the extent to which the data gathered during the job analysis process is consistent across the occupation including locations, businesses, workers, etc.

Skill attainment - The mastering of competencies required to successfully perform in the world of work.

Skill standards - Performance specifications that identify the knowledge and competencies an individual needs to succeed in the workplace. Standards are defined by occupational areas and validated by

representatives from the occupation. Standards include the functions, activities and performance criteria for an occupational area.

Stakeholders - Generically, the groups or individuals who have a vested interest in, or are in some manner affected by, a system, process, plan, product or service.

Standard occupational classification (SOC) code - The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. All workers are classified into one of hundreds of occupations according to their occupational definition. To facilitate classification, occupations are combined to form major groups, minor groups, and broad occupations. Each broad occupation includes detailed occupation(s) requiring similar job duties, skills, education, or experience.

Subject matter expert (SME) - A worker who is actually performing in a job that is encompassed within the occupational area being analyzed. These workers are considered to be "experts" in identifying the work- and worker-oriented information and related knowledge and skills of the occupational area because of their direct, "hands-on" experience. Subject matter experts generate and validate the work- and worker-oriented data in the skill standards development process, regardless of the job analysis method used.

Taxonomy - Classification; in relation to skill standards, an orderly classification of skills and knowledge that varies according to the model/tool used to organize worker-oriented information.

Work-oriented information - Information that describes work by the characteristics of the work to be done, encompassing the essential characteristics of critical work functions, key activities and performance criteria. Products or services produced are included in work-oriented information.

Worker-oriented information - Information that describes work by the worker characteristics or attributes associated with effective performance of the work, encompassing such characteristics as worker skills, knowledge, and abilities.

Appendix B

SKILL STANDARD EXAMPLE

Occupational Title: Fuel Cell Systems Technician			
Critical Work Function **1. Commission and start up fuel cells**		**Occupational Skills, Knowledge & Conditions**	
Key Activity	**Performance Criteria** *How do we know when the key activity is performed well or performed successfully?*	**Occupational Skills & Knowledge**	**Conditions**
1.2 Install upgrades / retrofits as required	1.2.1 Pertinent upgrades are installed according to manufacturer specification 1.2.2 Upgrades perform according to manufacturer specification 1.2.3 Site log is current and up to date	Ability to read schematics, blueprints, etc. Electrical systems, symbols, and terminology Three-phase power theory Single- and polyphase power distribution Instrumentation basics Mechanical systems Motor control circuits Programmable logic controllers FC electrical and safety codes & standards Electronics Application specific safety procedures Basic power system coordination Circuit interrupting systems Quality control Testing and measuring procedures Safety training	Office computer application software Unit controller software Power and hand tools Tubing bender Safety equipment Personal protective equipment Cell phone Personal technical library

Occupational Title: Fuel Cell Systems Technician																
CWF 1 Commission and start up fuel cells																
Listening	Speaking	Using Information and Communication Technology	Gathering and analyzing Information	Analyzing and Solving Problems	Making Decisions and Judgments	Organizing and Planning	Using Social Skills	Adaptability	Working in Teams	Leading Others	Building Consensus	Self and Career Development	Writing	Reading	Mathematics	Science
3	2	3	3	4	4	4	2	3	3	3	3	3	2	2	3	3

Statement of Assessment for Critical Work Function 1: Commission and start up fuel cells

A. Tests could include:
1) Multiple choice and essay questions that demonstrate an understanding of knowledge being assessed.
2) Preparation and justification of a reasonable solution to a problem scenario.

B. Hands-on exercises or simulations to demonstrate acquisition of knowledge and skills that could:
1) Apply relevant knowledge or skills
2) Focus on the application of knowledge and skills to a new situation
3) Demonstrate an ability to plan, organize, and create a product, service, or an event.