Formerly
DOE-HDBK-1076-94

TABLE-TOP JOB ANALYSIS

U.S. Department of Energy
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FOREWORD

Table Top Job Analysis (TTJA) can be used for needs, job, and task analysis, but the focus of this document will be on job analysis. Department of Energy (DOE) Order *426.2, Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities,* stresses the importance of training programs that are based on a systematic approach. An integral part of any systematically-developed training program includes an analysis of the jobs to be performed. TTJA is one "systematic" method of many that can be used by DOE contractor organizations to obtain high quality job analysis.

TTJA is not the only method of job analysis; however, when conducted properly, TTJA can be cost effective, efficient, and self-validating; and represents an effective method of defining job requirements. DOE O426.2 strongly endorses and recommends TTJA as the preferred method for analyzing jobs for positions addressed by the Order.

The DOE Handbook, *Table-Top Job Analysis*, which is the basis of this document, was developed using DACUM (Developing A Curriculum) principles that were refined at Ohio State University. The National Center for Research in Vocational Education was also helpful with information exchange during the development of the original Handbook.

DOE contractors should not feel obligated to adopt all parts of this document. Rather, they can use this information in conducting job analysis as the information and methods apply to their facility.

Beneficial comments (recommendations, additions, and deletions) and any pertinent data that may be of use in improving this document should be addressed in the Comments Section of this forum.

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1. SCOPE

1.1. Scope

This document provides information for conducting Table Top Job Analysis (TTJA). It is based upon former DOE Handbook 1076-94 with the same title. An overview of job analysis is provided that is followed by a look at some of the types of analysis that are conducted. Finally, the TTJA method is explained in detail. Appendices include facilitator and coordinator guides to provide further information and examples of TTJA.

1.2. TTJA is One Method

TTJA is not the only method of job analysis; however, when conducted properly TTJA can be cost effective, efficient, and self-validating, and represents an effective method of defining job requirements.

2. APPLICABLE DOCUMENTS

2.1. Government documents

2.1.1. DOE standards, handbooks, technical standards lists (TSLs), and specifications

The following DOE standards, handbooks, TSLs, and specifications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the *DOE Standards Index* (DOESI) cited in the contracting document

- DOE-HDBK-1078-94, Training Program Handbook: A Systematic Approach to Training.

Unless otherwise indicated, copies of DOE standards, handbooks, and TSLs are available from the Office of Scientific and Technical Information (OSTI), P.O. Box 62, Oak Ridge, Tennessee 37831.

2.1.2. Other Government documents, drawings, and publications

- None

2.2. Non-Government publications

The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents adopted by DOE are those listed in the issue of the DOESI cited in the contracting document. Issues of documents that are not listed in that DOESI shall be the issues of the non-Government standards cited in the contracting document.

- Blank, William E., *Handbook for Developing Competency-based Training Programs,* Englewood Cliffs, N.J., Prentice-Hall, 1982.
- General Physics Courseware, *Designing and Managing Instructional Programs,* Volume III in the Instructor Training Series, 1983.
- Norton, Robert E., *DACUM Handbook,* The National Center for Research in Vocational Education, Ohio State University, 1985.

"Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services."

2.3. Order of precedence

In the event of conflict between the text of this document and the references cited herein, the text of this document should take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specified exemption has been obtained.

3. GENERAL GUIDANCE

3.1. What is Analysis?

Developing training using a systematic approach, involves five phases: analysis, design, development, implementation, and evaluation. In the analysis phase, training needs are determined. When training is selected as part of the solution, the analysis phase creates the data that serves as the foundation for the systematic development or revision of training programs. This data is obtained from three sources: job needs, learner needs, and organizational needs. When done effectively analysis is a cost benefit. It saves more than it costs by ensuring that training resources are spent where they are most needed.

The products of analysis can include descriptions of training deficiencies, recommended solutions, required content, and if a job specific training program is being developed, a list of tasks for job performance. Job analysis is specifically used to develop a task list.

3.2. Overview of Job Analysis

Job analysis is a systematic method used in obtaining a valid task list for a specific job. A job is a group of major activities assigned to one individual (e.g., a maintenance mechanic). A job can be divided into functional units called duty areas. A duty area is a distinct major activity involved in performing the job (e.g., duty areas for a maintenance mechanic job could be pumps and fans). Although identifying duty areas is not required, duty areas are a convenience in organizing tasks when conducting job analysis. Duty areas consist of collections of related tasks. A task is a measurable, well-defined unit of work, with an identifiable beginning and end (e.g., tasks for the pump duty area could be install pump, repair pump, service pump, inspect pump).

The job analysis process involves the following steps:

- Developing a list of tasks performed in the job
- Validating the task list
- Selecting tasks for training
- Entering all tasks in a task-to-training matrix

There are several methods that can be used to perform job analysis. All methods of analysis have advantages and disadvantages, so each analysis situation must be considered to determine the best method of analysis. Some of the types of job analysis are briefly discussed below.

3.3. Types of Job Analysis

3.3.1. Verification Analysis

Verification analysis is the process of reviewing task lists of similar job positions to extract task statements that match or nearly match the job being analyzed. This method of job analysis should always be considered first. There are many jobs within and external to the DOE community for which task lists have been developed.

Detailed operator job (and task) analyses have been conducted and are available for DOE's reactor facilities. Additionally, industry analyses that can be adapted to many of the DOE nuclear facility positions are available for many of the maintenance and technician positions. Time can be saved by locating and using these lists, and with the help of subject matter experts (SMEs) and instructional technologists, deciding which tasks apply and which do not, and identifying the tasks that are different. Other sources of task lists include DOE orders, Guide to Good Practices, DOE Handbooks and Standards, other DOE facilities, commercial nuclear utilities, and vocational programs.

3.3.2. Document Analysis

Document analysis involves a systematic review of operating and administrative procedures and other job related documents to develop a task list. After an initial list is developed from these sources, SMEs validate the results and select tasks for training using surveys, table top, or other consensus-based approaches to determine facility needs. This method is especially appropriate when job responsibilities are well documented by accurate procedures and other job-related documents. Often task lists can be written directly from the list of procedures with little additional analysis.

3.3.3. “Traditional" Job Analysis

Traditional job analysis involves a combination of research, job incumbent interviews, and surveys. The process typically involves the following eight steps: (1) review available job information; (2) select and train job analysts; (3) develop the task listing; (4) validate the task listing; (5) prepare the survey questionnaire; (6) select the survey sample and conduct the survey; (7) analyze the survey results; and (8) validate the results. This method can be relatively time- and resource-intensive and should only be used when the job is complex and very critical to the mission of the facility, or when adequate accurate sources of information are not available (i.e., accurate procedures, task lists, SMEs) or other less rigorous methods are not considered adequate to produce necessary results.

The method that this document will focus on is the Table-Top Job Analysis method.

3.3.4. Table-Top Job Analysis

Table-Top Job Analysis (TTJA) is one way to determine training requirements. TTJA is a process which uses small focus groups and a facilitator to reach consensus on job needs. TTJA has been used successfully in conducting needs, job, and task analysis. It can be a very effective method of quickly determining, at reasonable costs, the tasks that must be performed by persons employed in a given job area. Conventional analysis methods can be slow, laborious, expensive and unusable. This method is also referred to as a focus group approach.

Although the TTJA process can be used for different types of analysis, this document will focus on its use in conducting job analysis. It provides techniques and information in conducting job analysis using a table-top or focus group approach.

3.4. Purpose of Table-Top Job Analysis

Table-top job analysis has been used to analyze jobs at various levels including professional, technical, skilled, and semi-skilled. Table-top job analysis operates on the following three premises.

- ***Expert workers*** are better able to describe/define their job than anyone else.

- Any job can be effectively and sufficiently described in terms of the ***tasks*** that ***successful*** workers perform in that job.

- All tasks have direct implications for the ***knowledge, skills*** and ***attitudes*** that workers must have in order to perform the tasks correctly.

A carefully chosen group of expert workers (subject matter experts and supervisors) from the job being analyzed form a TTJA team. A facilitator guides the team through the two- or three-day session to complete the task list (There is also some up-front time involved in properly planning the table-top job analysis). Brainstorming is one technique used to obtain the collective expertise and help the team reach consensus.

Since the team consists of people with expertise in their job, team members do not need advance preparation. Generally, team members find work on the team both professionally stimulating and rewarding.

It must be stressed, however, that some job positions may not have any "experts." This is especially true when a new position is created or at facilities that are in the early stages of operation. In these cases, the job analysts may decide to use a method other than table-top job analysis.

A six step process is guided by the facilitator during the session:

1. Orient team (training portion)
2. Review job
3. Identify duty areas
4. Identify tasks
5. Sequence tasks and duty areas
6. Select tasks for training.

The TTJA normally results in identifying 8 to 12 duty areas and 50 to 200 task statements that outline what a successful worker in a job area must be able to do (These numbers may vary depending on the job being analyzed.)

Accurate work by the TTJA team is important since these tasks will form the basis for developing lesson plans and/or courses for their training program. Since analysis is the first step in the performance-based training model, it is imperative that the team work together to establish an accurate task list. If the analysis is faulty, the instructional products developed will be faulty. An analysis of these tasks is performed to provide the basis for the skills and knowledge that are incorporated into the instructional products.

3.5. Advantages of Table-Top Job Analysis

TTJA, when used properly, can provide a more efficient and cost-effective method of job analysis than traditional methods. TTJA is inexpensive in comparison with job task analysis since each analysis is completed in two to three days. The end product of a TTJA, the task list, can be favorably compared in validity with any other method.

An additional benefit of the process is the partnership that forms between the training department and the operating organization doing the analysis since the team is primarily comprised of people from both areas.

3.6. When Should Table-Top Job Analysis be Used?

Although TTJA has been used for several purposes, it is ideally suited for determining (a) the tasks that should be addressed when developing new training programs (b) the tasks that should be covered by existing training programs, and (c) the current accuracy and relevance of an existing task list.

TTJA can quickly identify the tasks that a successful worker must be able to perform on the job. Using the identified tasks in the instructional products of a new training program will help ensure curriculum relevance.

TTJA can be used to verify the tasks that currently exist in training programs. Once the tasks have been generated by the TTJA team, the tasks can be compared with existing tasks and training materials, and the necessary revisions can be made.

TTJA can also be used to review existing task lists to determine if they still portray an accurate picture of the tasks performed by workers in a job. Changes can be made to existing tasks lists based on information from TTJA sessions.

4. DETAILED GUIDANCE

4.1. Table-Top Job Analysis Quality

4.1.1. Factors That Impact Quality

TTJA quality is directly linked to two critical factors: (a) assembling a team of two to six subject matter experts, 1 supervisor, and 1 safety engineer/specialist, and (b) using a trained TTJA facilitator. A trained TTJA facilitator (one who has been trained in the methods of table-top job analysis) is required to maximize effectiveness of the job analysis. Without both factors, the resulting analysis is questionable at best.

Some general conventions associated with TTJA are listed below:

1. The coordinator/facilitator is qualified through training and practical experience.
2. Team members are subject matter experts (SMEs).
3. Supervisors that are on the team are SMEs as well.
4. The same team members participate throughout the entire session
5. Tasks statements meet the criteria for acceptable task statements

4.1.2. <u>Table-Top Job Analysis Team Member Roles</u>

For TTJA to be successful, the team that is put together must operate together as a team. Each member must be aware of his/her role and responsibilities while on a TTJA team. Observers are welcome but must not participate as team members.

4.1.3. <u>Table-Top Job Analysis Coordinator</u>

We use the term *table-top job analysis coordinator* to refer to the person who plans the job analysis process, makes the necessary pre-session arrangements (including selection of team members) and provides for verification of the team-generated tasks. The coordinator may or may not act as the facilitator of the session.

See Addendum A - Coordinator Guide for further information.

4.1.4. <u>Table-Top Job Analysis Facilitator</u>

A key role in the TTJA process is the facilitator. This person will guide the team throughout the session and often the success of the TTJA session rests with the proficiency of the facilitator. Whereas many persons can perform the role of coordinator (i.e., carry out the pre-session planning and arrangements and post-session activities), the facilitator's job requires some special personal qualities, traits, and characteristics. A TTJA facilitator might be characterized by many of the following attributes:

- A professional image and outlook
- A sensitivity for others

- The ability to establish and maintain enthusiasm
- A sense of humor
- The ability to show empathy
- The ability to display and maintain a positive image
- Patience
- The ability to make decisions
- Skill in job analysis procedures
- The ability to display warmth and establish rapport quickly with team members
- Skill in questioning
- A high degree of sensitivity to both verbal and nonverbal communication
- The ability to motivate, encourage, and focus team members
- Ability to act as process expert while team members act as content experts
- Appreciation of small-group processes so that team members can work things through by themselves
- Excellent listening skills and memory
- The ability to encourage a consensus from the individuals on the team

The facilitator must be intimately familiar with the TTJA process, since the process is so structured. Although some flexibility is allowed during facilitation, there are definite parameters and sequences of events.

The multi-skilled facilitator must establish and maintain the team's pace, balance, and participation style; clarify vague statements; and facilitate selection of the most appropriate action verbs, task statement modifiers, and nouns. The facilitator must motivate and lead the group and monitor the process, yet never impose content judgments or decisions on the team members.

When an organization is looking to designate a TTJA facilitator, the organization management must carefully assess the candidate's personal traits and characteristics before assigning this responsibility. At a minimum, the candidate should be extremely familiar with the job/task analysis process (Instructional Technologists in a training department are normally adept at this) and have excellent facilitation/process skills. When possible, the candidate should also successfully complete TTJA training.

Addendum B contains a Facilitator Guide.

4.1.5. Co-facilitator

A co-facilitator should be selected to assist the facilitator from the beginning to the end of the session. This person's function is to assist the facilitator as necessary in conducting the TTJA session. The co-facilitator may be asked to do the following:

- Assist in teaching orientation lessons
- Facilitate in various steps of the process
- Help post duty areas, tasks, and any supporting materials
- Generate task lists and other TTJA materials on the computer.

The facilitator and co-facilitator may switch roles throughout the seminar. The role of the co-facilitator is further explained throughout Addendum B.

4.2. Planning the Table-Top Job Analysis Session

Proper planning will help ensure that a successful and productive TTJA session occurs. Major areas of concern in the pre-session planning phase include: (a) securing management's approval and support, (b) involving appropriate staff in the planning process, and (c) developing a schedule of major events and activities. Normally, the TTJA coordinator is responsible for initiating the planning process and making the necessary arrangements, however, the coordinator must enlist the assistance of those people necessary to gain their understanding, support and commitment to the entire process.

4.2.1. Securing Management's Approval

Before any TTJA session is planned or conducted, key personnel within the facility must be informed, and more importantly, become committed to the TTJA process. TTJA will not be a success unless the facility administration and management is behind the process. Management can allot the necessary funds and personnel to help ensure the success of the session.

4.2.2. Involving Staff in the Planning Process

Whenever a coordinator conducts activities that may affect others at a facility the way TTJA can, the coordinator should involve, as appropriate, those people who are likely to be affected by or concerned about the resulting changes. Involving these people elicits their understanding and support of the process, which is vital for changes to take place as a result of the TTJA. When planning for a TTJA session at a facility, the coordinator should try to involve the following individuals: (a) managers, (b) instructional staff, and (c) support personnel.

Facility managers whose people will be used on the team should be informed of the TTJA process, its benefits, and the reasons for selecting specific people for the team. These managers should also be aware of the coordinator's plans so that they can approve the time schedule, budget, personnel involved, and job selected.

Since the results of the TTJA are going to be used as the basis for developing or improving instructional products, facility instructional staff should become involved in the process. The instructional staff should send representatives to observe the process and take notes. The discussions that take place among the team members can be beneficial to the instructors. It is best to keep instructors off of the team. However, the instructors can be used as sources of information about prospective team members.

The instructional staff may also act as coordinators, facilitators, or as sources of information to help identify program areas needing TTJA task lists.

4.2.3. Determining the Size of the Table-Top Job Analysis Team

A successful TTJA team can consist of as few as three members, not including the facilitator. The subject matter experts are those who perform the job being analyzed, and undoubtedly are in the best position to explain "what they do." Their immediate supervisors can provide continuity to the process since they also know the worker's jobs. The supervisors can also act to filter the tendencies of some personnel to include managerial or other higher level tasks that they do not actually perform. For example, Facility A is going to conduct a TTJA session on the Laboratory Technician job description; the best team members for the team would consist of Laboratory workers and supervisors from Facility A.

Sometimes, a facility is so small that it is impossible (because of scheduling, shift obligations, etc.) to assign enough team members to the team. One option for smaller facilities is to reduce team size down to the minimum, only three members plus the facilitator. If a team still cannot be generated at a facility due to a lack of personnel, the facility can contact neighboring facilities that also employ the job being analyzed. For example, a TTJA team for Laboratory Technicians at Savannah River Lab might consist of Laboratory Technicians from S-Area, H-Area, and K-Area.

4.2.4. Developing a Schedule of Events and Activities

A number of specific activities need to be planned and carried out in advance of the session by the staff and coordinator. A schedule of activities from ninety days prior to the session and a daily session schedule are included in Addendum A.

4.2.5. Selecting and Preparing Room for Session

Because the TTJA process depends heavily on group dynamics, there are certain features required for the room in which the session will be conducted. The room selected should have an unbroken wall surface of at least 30 feet and should be of sufficient size to house the team and any observers comfortably. There should be no doors, windows, or other obstructions on the wall that will be used to construct the TTJA chart. The room should be located in a quiet area and should be well lighted and ventilated. The facilitator should check the climate control system prior to the session.

To facilitate interactions that must take place in a TTJA session, the members should be comfortably seated so that they can easily see and hear each other, as well as read items placed on the wall. The best arrangement is to seat team members in a semicircular arrangement, so that they can actually face the wall where their ideas will be posted. The tables also create work space for the team members. A small table for the recorder should be located at one end of the wall. Figure 1 illustrates the desired seating arrangement

There are pros and cons to conducting the TTJA session at the facility versus away from the facility. As long as a room is conducive to interaction and is free from distraction, the specific location is a secondary consideration. However, when a TTJA session is conducted at a facility, work-related distractions can be more frequent. For this reason, it may be more beneficial to conduct the session in an offsite meeting room.

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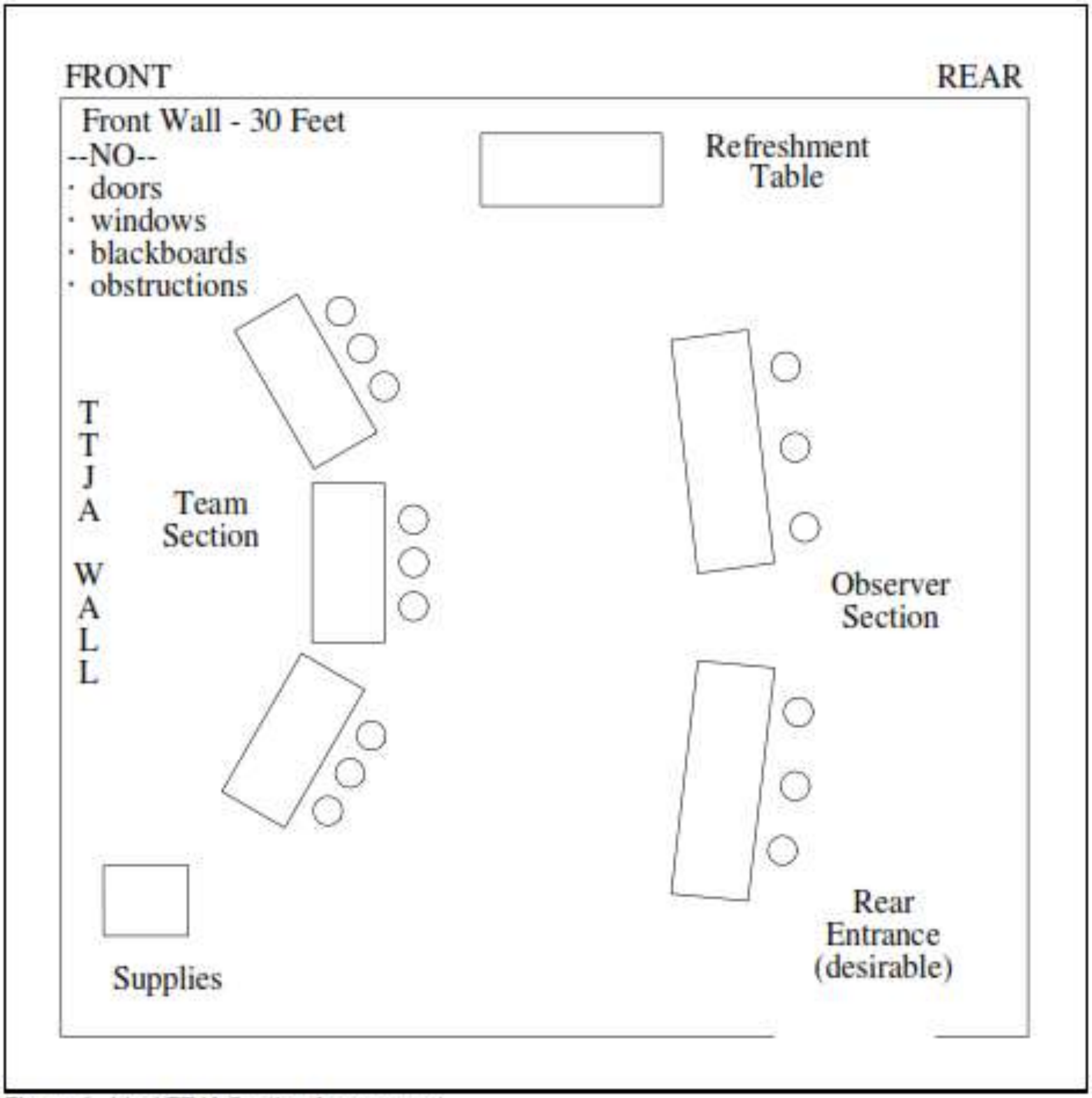

Figure 1. Ideal TTJA Seating Arrangement

4.2.6. Selecting Team Members

One of the most important tasks associated with TTJA session preparation is selecting team members. If the team members are improperly selected it is very possible that the results of the TTJA will be incorrect. Several considerations must be taken when selecting team members.

The first priority is to determine the job to be analyzed. Too wide or too narrow definitions of a job can be detrimental to the TTJA process. Defining the job too narrowly may result in training programs that limit the progress and opportunities for workers. Defining the job too widely may result in a program that requires more time than is reasonable, or trainees who receive only general preparation for completion of a task. When a team is assembled with extreme diversities the process may break down, since members may not be familiar with the work of others in the group.

Since the job definition that is used predetermines who the eligible team members are, it is imperative to define the job as accurately as possible. Decisions must be made, based on selection criteria, as to the types of workers to be included and excluded.

For the TTJA coordinator, the selection of these team members is probably the most critical aspect of organizing a successful session. The quality of the interactions, as well as the quality of the generated task list, depend heavily on the people selected. Experience suggests the following criteria to guide the selection process:

- Technical Competence
- Full-Time Employment
- Occupational Representativeness
- Communication Skills
- Team Player
- Freedom from Bias
- Full-Time Commitment

Anyone selected as a TTJA team member must be ***technically competent*** and perceived as an expert in the job being analyzed. Individuals selected should be highly skilled in their job and should be aware of current developments and needs in the field. Many years of employment does not necessarily qualify a person as a competent TTJA team member. Generally, the immediate supervisor of the workers can identify the most technically competent individuals.

Individuals selected should be ***full-time employees*** in the job that is to be analyzed. This helps ensure their knowledge of and familiarity with all aspects of the job. Some of the people may be supervisors, as long as they are directly supervising the workers whose jobs are being analyzed. Supervisors who have had recent practioner-level experience in the job can provide useful insights into the job being analyzed and continuity to the process. However, no more than 20% of the team should be supervisors.

If the job to be analyzed is diversified, the team members should be selected for ***occupational representativeness***. To the maximum extent possible, the make-up of the team should reflect the actual employment situation for the job being analyzed.

Team members must possess ***communication skills***, since they must be able to describe the tasks they perform. Some highly skilled workers are either unable or extremely reluctant to interact in a group setting. To be effective contributors, team members should be reasonably articulate in order to explain what they do in a precise and accurate way. Because the TTJA process involves brainstorming and consensus seeking, the team members must be able to listen respectfully to the views of others and participate effectively in group discussions.

Each member should be a ***team player*** who believes in the TTJA approach to job analysis and who desires to participate in the process. This excludes people who are "sent" without explanation or are simply assigned by their supervisor to "fill a seat" on the team. Members should be able to interact without dominating or being dominated and should not overreact to criticism or to having their contributions analyzed or reorganized.

Team members should have an open mind and be ***free from biases*** related to training methods, training time, and trainee qualifications. This is the primary reason for not including instructors as part of the team. Since instructors might be concerned with having to teach identified tasks, instructors may try to influence the team's contributions.

Team members should make a ***full-time commitment*** to the session for the required time. It is better to select an alternate member than to accept someone who will disrupt the process or destroy the continuity by being there only part of the time. It is important to stress the importance of being on time for all sessions, because people who are late or are part-timers who miss some of the orientation or group discussion may seriously disrupt the group process. This is one of the reasons that an off-site meeting room may be more beneficial than an on-site meeting room.

4.2.7. Informing Team Members

At this point, the coordinator should have defined the job to be analyzed, identified potential sources of team members, and determined the criteria to be used in the selection of members. Two other major tasks must be carried out before the TTJA session: (a) contacting the organizations that have the type of expert workers needed, and (b) contacting the prospective team members.

A coordinator may be hesitant about contacting organizational management to ask if they are willing to participate in the TTJA session by releasing one or more of their best workers for two to three days. However, management will gladly participate in the process when they know that the effort will be worthwhile.

An important aspect of contacting the organizational management required for the TTJA session is to stress how the organization's expertise is needed to update or establish a training program. The coordinator should assure the organizational management that the process will not be successful without the help of the organization's experts.

When possible, it is important for coordinators to make an appointment to visit the necessary managers to explain the TTJA process and to request their cooperation in nominating and releasing one or more workers. During the visit with the organization, the coordinator should be prepared to explain the TTJA process, how the results will be used, and the qualifications of the worker or supervisor needed. A one- or two-page written explanation and a sample TTJA task list to leave with the organizational management can be very helpful.

The best way to obtain team members for a TTJA team is to meet personally with each nominee, as arranged through the organizational management, thirty to sixty days in advance of the session. If there is sufficient time, this one-on-one technique elicits the best results.

Prospective team members may be hesitant to make commitments to a new or different experience. The TTJA coordinator should explain the member's role in the process. The prospective members should be told what to expect from the TTJA session and that support from management for their involvement has been secured.

During the explanation, the coordinator should stress the importance of the full-time commitment to the session. Each team member should be present and participate in all portions of the session. Coordinators should not ask someone to be a team member if they are obviously not interested in the activity. Such a person probably will not be a major contributor to the process and may even be detrimental to the session success.

If proper selection procedures are followed, few workers will object to participating. Most people will gladly donate their time to the TTJA process.

To complete the selection process, it is highly recommended that the coordinator make confirming phone calls to each member five to ten days prior to the session. This provides them with an opportunity to ask any questions and to confirm their plans to attend the session. If several people must cancel at this time, there is still time to seek qualified alternates.

4.3. Conducting the Session

After preparations have been made, the next task is to conduct the session. There are six major steps involved in conducting a successful TTJA session. The steps are listed below.

1. Orient team (training portion)
2. Review job
3. Identify duty areas
4. Identify tasks
5. Sequence tasks and duty areas
6. Select tasks for training

4.3.1. Orient Team (Step 1)

The first step in any TTJA session is to carefully orient the team with what will be happening during the session. The orientation must be well done and should use an informal, nontechnical explanation of the process. A process that uses the table top approach appears in Addendums A and B.

4.3.1.1 Conduct Introductions. The normal procedure for conducting introductions is for the TTJA coordinator to start the meeting at the designated time and then to introduce the responsible organization's representative so that he/she can officially welcome the team members. This introduction should be brief, however, it is important that a high-level official greet the members to help stress the importance of the session.

The TTJA coordinator should then introduce the facilitator (assuming a different person fills this role) to the team. The coordinator should acknowledge the skills and experiences of the facilitator that relate to conducting TTJA. The most important thing is to keep the introduction brief, since lengthy introductions may annoy some people.

At this point, the facilitator should take over and maintain leadership of the session. The facilitator should immediately establish a warm, safe, and friendly environment. After a brief personal greeting, the facilitator should ask the members to briefly introduce themselves. Ice breaker activities are very effective for introductions. At a minimum, the members should give their names, organization's name, current position, and a brief description of the work they perform on a daily basis.

The facilitator should also introduce the recorder and briefly explain the nature of that person's job. It is important that the team members understand that the recorder is not one of them but is present to help the facilitator accurately record the team's contributions.

4.3.1.2 Establish Rapport and Create a Participatory Atmosphere. After the appropriate introductions, the facilitator's major responsibility begins. The facilitator must present an overview of the entire TTJA process in a relaxed but forceful manner. The opening minutes of the session can "make" or "break" the members' enthusiasm and attitudes.

The facilitator should quickly establish a first-name basis with the members, and congratulate them on their selection into the team. The facilitator must also stress the importance of the member's individual and collective participation in the process.

The facilitator should exude his or her enthusiasm and belief in the TTJA process. One approach is to discuss generally how organizations have successfully used the TTJA process to develop and update task lists upon which the technical training program will be based.

The facilitator should try to put the workers at ease and reduce possible anxieties by telling them their job is primarily one of collectively describing what tasks they perform when carrying out their jobs successfully. The responsibility of developing instructional strategies and materials will rest with the training organization.

Once a safe environment and rapport has been established, a formal explanation of TTJA can begin.

4.3.1.3 State the Philosophy Behind TTJA. To gain the full cooperation of the team members, it is useful to explain the following three assumptions, which are the foundation for the TTJA process:

- ***Expert Workers*** are better able to describe their own job than anyone else.
- Any job can be effectively and sufficiently described in terms of the ***tasks*** successful workers in the occupation perform.
- All tasks have direct implications for the ***knowledge, skills,*** and ***attitudes*** that workers must have in order to perform the tasks correctly.

These three statements summarize, simply but clearly, the philosophy behind the TTJA process. The members need to understand and accept the premise that, in order to perform a task correctly, a worker must know what to do when and how (knowledge), as well as understand why (attitudes) the task should be performed in the first place and that a worker must be able to perform a given task (skill).

The facilitator should explain the step following job analysis, which is determining training program content. This is where each task statement is broken down into the specific steps or operations involved, knowledge needed, attitudes required, tools and equipment needed, etc.

The results of this process will be used in preparing instructional materials for the trainer and trainees.

4.3.1.4 <u>Clarify the Role of the Facilitator and the Team Member.</u> The facilitator must establish his/her role clearly and thereby establish his/her credibility as the process expert, simultaneously acknowledging the team members as the job experts. Since the facilitator is not a job expert, there is less chance of his/her being biased with any decisions that the team makes.

The facilitator has a very difficult role. He or she cannot influence the technical judgments or contributions of the team. If the members feel that a task is completed by their occupation, the facilitator must include it on the chart. The facilitator must agree with all decisions that are reached consensually.

Nevertheless, he or she should insist that members operate within specific guidelines. The facilitator must provide them with criteria, directions, sets of guidelines, and analogies that will help them accomplish their task.

The team members in the TTJA process are charged with listing the tasks required to be successful in the job. Hence, their role is vital in development of the TTJA task list.

The role of the team member is a unique one. Singly, and in groups, the members are asked to define their jobs by identifying all of the important tasks they currently perform on the job. The team members are the experts, and it is they who must discuss, debate, and occasionally even argue about what is really important to their jobs.

Team members must be given the authority to make decisions regarding the tasks involved in the job. If the facilitator tells them they are the experts and carefully listens to them as the analysis proceeds, they will accept the collective decision-making role and produce a good analysis. If, on the other hand, the facilitator says they are the experts and then proceeds to drive the analysis process, he or she soon loses the support and cooperation of the team.

4.3.1.5 <u>Explain the TTJA Process.</u> At this point, the facilitator should be ready to provide an overview of the six steps of the TTJA process while motivating them to get started. Detailed explanations should not be presented at this time.

Step 1 -- Orient Team. The facilitator is in the process of performing this step, which should be finished shortly. The goal has been to provide an introduction to the TTJA process and to explain to the members the importance of their role in it. Emphasis should be placed on the advantages of using this technique, which includes the fact that, in a short period of time, at low cost, TTJA can be used to effectively identify the tasks important to the job being analyzed.

Step 2 -- Review Job. In this step, the major purpose is to explain the boundaries of the job being analyzed. Any related job titles and specializations to be included or excluded must be known by all members.

Step 3 -- Identify duty areas. The next step is to determine the duty areas of the job. These statements should reflect functional areas of responsibility under which all the specific tasks will fit. Most jobs can be divided into eight to twelve duty areas. These statements are then written on 8 1/2" X 11 " sheets of paper and placed in a vertical column on the left side of the wall facing the team.

Step 4 -- Identify tasks. The fourth step involves taking each duty area and specifying the tasks that are performed within that duty area. This step takes the most time, since 50 to 200 tasks may be involved, depending on the complexity of the job. Each task statement should begin with an action verb and describe an observable behavior.

Step 5 -- Sequence tasks and duty areas. Once the tasks are identified, the team must organize the tasks into some logical sequence. Since the task lists are used to develop instructional material, it is logical to ask the members to sequence the tasks within each area in the recommended instructional sequence. The members then sequence the duty areas.

Step 6 -- Select tasks for training. The team should use criteria to determine the frequency, importance, and difficulty of each task. The team also must determine whether the tasks are PT - pre-train, T - train, OT - overtrain, or NT - no train, using established criteria.

4.3.1.6 Explain the Guidelines for Team Operation. The following guidelines or ground rules for team member participation have proven to be effective and should be discussed with any new team:

- Everyone should participate appropriately. All team members have been carefully selected and are considered equally qualified.

- Members should share their ideas freely with the group. There are no right or wrong answers. Members should think out loud and let other team members help frame task statements.

- Members are encouraged to "piggyback" on the ideas of others. Members can give their spontaneous responses without weighing their value at the time of the response.

- Members should focus on offering constructive suggestions rather than negative criticisms or comments. This means that each member must listen carefully to the views and comments of others.

- Task statements should be accepted as soon as a consensus is reached on them. Group consensus occurs when the entire team can accept a decision that is made. If consensus is not readily reached, record the task and come back to it at the end of the session. Subsequent discussion may help clear up any issues the group may have.

- Members should use references AFTER brainstorming to ensure that no tasks have been missed.

- Observers who are present <u>CANNOT</u> participate.

- All task statements should begin with an action verb (see Addendum C – Action Verbs) and should reflect observable worker performances.

4.3.1.7 <u>Facilitating Group Interaction.</u> Two major responsibilities should be dealt with concurrently as the next phase of the TTJA session begins. Immediately following the orientation to TTJA, the facilitator should simultaneously begin facilitating group interaction and constructing the TTJA task list.

A TTJA facilitator must cultivate and use his/her interpersonal skills. Basically, the TTJA process requires the facilitator to guide the participation and interaction of team members in a specific sequence through brainstorming and consensus-seeking activities. At the same time, the facilitator must enforce the basic ground rules of brainstorming and adhere to the basic principles of TTJA.

Because a facilitator is responsible for facilitating many small-group brainstorming sessions, the rules for productive brainstorming during a TTJA session are summarized here.

The facilitator should:

- Stay focused on the group process "how are they accomplishing their task"
- Encourage each team member to contribute
- Listen actively to all contributions
- Control participants who try to dominate
- Readily accept as many contributions as possible

- Avoid criticizing participant's contributions
- Verbalize contributions to ensure accuracy and clarity
- Provide frequent positive reinforcement
- Repress own biases and opinions
- Probe and encourage with questions
- Set and maintain an enthusiastic climate.

The team members should be encouraged to do the following:

- Offer content contributions freely
- Share ideas among themselves
- Help one another frame statements
- Limit value judgments about the contributions of others
- Begin all task statements with an action verb
- Avoid statements using knowledge and attitudes.

The facilitator must be adept at communication skills for the session to be a success.

At this point the facilitator starts to apply his/her TTJA facilitation skills in actually constructing the TTJA task list. It is assumed that the facilitator has already oriented the team members and has satisfactorily answered their questions concerning TTJA. The next section deals with information defining the job and its scope and proceeds step-by-step through each of the remaining stages of task list development.

4.3.2. Review Job (Step 2)

Immediately following the orientation, the facilitator should state which job the operating organization needs to have analyzed. The major purpose of this discussion is to clearly establish the parameters of the job to be analyzed. Everyone needs to know the specific program that is to be analyzed.

4.3.3. Identify Duty Areas (Step 3)

The next step after defining the job is to determine the duty areas of the job under which all specific tasks will fit. A duty area is one of the job incumbents' main functions, characterized by a grouping of closely related tasks. This is where the brainstorming process really begins, and where the facilitator must provide enthusiastic leadership. At this point, the team may be unsure and need considerable guidance.

For example, the team may have difficulty distinguishing between task statements and duty areas. The facilitator should point out that each duty area can generally be broken down into six or more task statements. Initially, it is important to get the information on paper and on the wall, even though the facilitator is aware that revisions may occur.

Generally, there are eight to twelve duty areas common for most occupations. However, the facilitator should continue to solicit contributions until the group feels that they have exhausted all possibilities regardless of the number of duty areas chosen.

Near the end of this phase of the analysis, the facilitator may ask, "Can you think of any job tasks that would not appropriately fit under one of the duty statements already on the wall?" The existence of such job tasks suggest that another area is needed.

After about an hour of discussion, the facilitator should have listed on the left side of the wall, in a vertical column, most of the duty areas of the job. When the contributions appear to be exhausted, the facilitator should read each of the duty areas aloud. Then the team should be asked if they wish to consider combining or modifying any of them. The facilitator should restate that any duty area that cannot be subdivided into six or more specific tasks should not remain as a separate duty area. Similarly, a single duty area should not be so broadly stated that it contains an excessive number of tasks.

The revision process should not be belabored at this point. The team will be able to make further changes as the analysis process continues.

Some sample duty areas include the following:

- Diagnostics
- Welding Equipment
- Pumps
- Cooling System
- Fans
- Preventive Maintenance

4.3.4. Identify Tasks (Step 4)

Once the duty areas have been established to the satisfaction of the team, the facilitator should be ready to focus attention on one duty area that could be fairly easy to delineate. Usually, the team can suggest a duty area in which a number of tasks can be readily identified.

This step is also primarily a brainstorming activity. This is the most important part of the TTJA process, since the task statements that are derived are the core of the task list. The content of a training program will be generated from these tasks.

During this phase, the facilitator should emphasize the need for statements that contain an action verb and clearly reflect observable worker performances rather than knowledge or attitudes. Unacceptable statements are any that begin as follows:

- The worker should know . . .
- The worker must understand . . .
- The worker has got to appreciate . . .

If certain attitudes or knowledge are needed by the workers, there must be one or more tasks for which the knowledge or attitude are needed. Instead of blanket rejections of a knowledge or attitude statement, however, the facilitator may respond by asking the following:

- What does the worker do with that knowledge?
- Why does the worker need to know that?
- Why is that attitude important?
- How does the worker use that attitude?

These questions usually encourage the contributor or another team member to respond by saying "If the worker doesn't know theory X, he or she can't___________." This should suggest an observable task statement. If it doesn't, the facilitator should permit the members to discuss the task further, so long as they stay on topic. The facilitator should also remind the team that each task statement should begin with the unwritten preface, "The worker must be able to. . ." Frequent verbal repetition of the task being delineated may be needed to help maintain the focus of the group discussion.

As the team begins to define the first duty area, it is important that the recorder record and post the task statements as soon as possible, with a minimum of debate and negative comment. It is easy to lose a team's commitment to the process at this point if the members begin to perceive the TTJA procedure as unworkable.

Facilitators should distribute a list of action verbs to the team members. Members may also review completed task lists to enhance their understanding of the process. An effective facilitator must be an expert at writing clear and concise task statements in order to guide the team. The facilitator must also know the criteria that characterize job tasks and high-quality task statements. Criteria for job tasks and task statements are as follows:

Job tasks

- Have a definite beginning and ending point
- Can be performed over a short period of time
- Can be performed independent of other work ID Consist of two or more steps
- Can be observed and measured
- Result in a product, service, or decision

Task statements

- Reflect a meaningful unit of work
- Contain an action verb and an object that receives the action
- May contain one or more relevant qualifiers but omit qualifiers such as effectively and efficiently
- Each statement is precise and short
- Each statement should stand alone
- Use terminology, common to the job
- Avoid use of double verbs, such as "remove and repair." Use the more inclusive of the two
- Avoid use of unnecessary and flowery modifiers such as correctly, accurately, etc.
- Avoid the use of equipment or tools statements that merely support task performance. The use of tools in and of themselves is not a task activity, but a means to achieving the work task.
- Include only one task in a single statement.

If statements are well written and meet the criteria as stated, less time will be required reviewing and refining the statements.

The facilitator should keep the team members from trying to focus on more than one duty area at a time. Similarly, the facilitator should not allow the team to re-sequence task statements during the initial brainstorming session; A sequencing step occurs later in the process. However, if a specific process is being delineated, it may be helpful to tentatively arrange the tasks in order to assist the flow of ideas.

A concern often arises over the specification of tasks related to the tools and equipment of the trade. Generally tools or equipment operation should be included as statements only when they reflect actual occupational tasks. The team should be instructed to think about whether the tool is used as a means to an end.

For example, an auto mechanic may use several tools when performing the task of "adjust a carburetor," the mechanic's use of a screwdriver and other wrenches in the process does not represent tasks by themselves.

Once the members seem to have exhausted all of the tasks for one duty area, the facilitator should determine if the team is ready to move to another. The facilitator must not curtail the task listing too soon, and no breaks should be scheduled while listing tasks for a duty area. The facilitator should then try to guide the team in selecting a duty area with similar tasks to the one that was just completed. It is easy for the team to bog down if it switches from procedural tasks to analytical or problem-solving tasks.

This process is continued until the group has identified tasks for all duty areas. Because this stage of the TTJA process is the most time consuming, it can tax everyone's endurance, patience, and adherence to the process. As long as the facilitator remains highly motivated and dedicated to the task, the team is likely to remain so, as well.

Once all the tasks for each duty area have been identified, the facilitator should conduct a review of each task statement on the task list. The goal at this time is to improve the overall quality of the task list. The skill of the team members to identify worker tasks accurately and precisely should have continued to improve as they advance from duty area to duty area. The facilitator can capitalize on this expertise by reviewing each statement and refining those that need improvement. No sequencing should be done at this time. The team should be permitted to add any new tasks found missing or to delete or reword tasks that overlap one another.

The facilitator should normally review the tasks in the same order that they were initially identified. The facilitator should repeat the statement as it is worded and ask the team members the following:

- <u>Critique the action verb.</u> Is it the most accurate descriptor of what the worker actually does?
- <u>Review the object.</u> Does it represent the thing or person acted upon by the worker?

- Check the modifiers or qualifiers, if any. Are the correct ones used? Are others needed? Have unnecessary modifiers, such as "effectively" and "efficiently," been omitted?

Reviewing the task list at this stage should result in considerable clarification and numerous word changes. New cards should be written for statements that are changed in order to keep the task list as neat as possible.

The facilitator must constantly challenge the team to think of the most accurate and descriptive terms. It is important to insist on consistency and clarity.

A few other points should be stressed. A task statement should contain as few words as possible (usually a maximum of eight) and still be completely descriptive. Often, two or three words are sufficient. Long statements tend to lack focus.

Each duty area should contain at least six specific task statements. If the group can specify only two or three tasks, the duty area should probably be combined with another related area. Conversely, if a particular duty area results in a large number of tasks (e.g., fifteen to thirty), there may be justification for dividing that large area into two duty areas.

Once the tasks in each duty area have been refined, the facilitator should ask the team if the duty statement is still an accurate description of that general area of responsibility. Sometimes the scope of the duty areas should be narrowed or broadened to reflect the specific tasks more accurately. To the extent possible, each duty area should include all the tasks within the area and exclude all the tasks specified for the other duty areas.

A quick check of available work procedures is beneficial to help validate this list. This review may identify some overlooked tasks. For example, while looking at procedures a task is found that is only performed every three years, is critical, but was not discovered during the brainstorming session due to its infrequency.

The facilitator's role is to stimulate the team to make any necessary refinements that may be needed. The facilitator should question and challenge their statements and even propose alterative wording, but must always allow the team to make all the technical content decisions.

4.3.5. Sequence Task and Duty Areas (Step 5)

Although sequencing the duty areas and task statements does not take a lot of time, the results of the sequencing add significantly to the quality and appearance of the final task list.

Before sequencing the task statements within each duty area, the facilitator should provide the team with a rationale for sequencing them. Because a TTJA analysis is usually conducted to provide a sound basis for later curriculum and instructional development, the best rationale for sequencing is to place the tasks that workers would normally learn and use first on the job on the left side of the wall.

The facilitator may ask team members to role-play the hiring of a new employee who cannot perform any of the tasks on the chart. The members then should decide, area by area, which tasks they would expect the employee to learn and practice first.

A few other factors should also be considered when sequencing the tasks. Some tasks, because they represent parts of an overall process, are performed in a natural, chronological flow and are very easy to sequence. Other tasks may involve activities that are very difficult to sequence because the order in which they are learned or performed is arbitrary. Sometimes they will discover two or more subsets of tasks in one duty area that logically follow one another.

Usually, the facilitator should select the first duty area to be sequenced. Based on his or her knowledge of what needs to be done, the facilitator can select an area in which some of the tasks are already sequenced according to the criteria or in which it appears that such sequencing may be readily accomplished.

An option here is to start with a duty area that has a clear space below it and simply move the duty area downward and begin placing the task statements to the right of it.

During the task sequencing phase, the team may discover a missing task statement, one that overlaps another, or some other need for revision to improve quality. The facilitator should not permit major changes at this point, but some revision can be expected. Once a group of tasks has been sequenced, review it from beginning to end (left to right) to ensure final agreement before going on to the next duty area.

Once the group has sequenced all of the task statements, the facilitator should ask the team to study all duty areas. The objective now is to organize the entire analysis as it will appear on the printed task list. Two factors should be considered at this point.

- First, sequence the duty areas logically (i.e., chronologically or hierarchically).
- Second, the facilitator should suggest the vertical shifting of one or more duties adjacent to an area that has similar tasks or that logically follows the previous band. It should be noted, however, as with the task statements,

that the top-to-bottom sequencing of the duty areas usually is partly an arbitrary one.

The facilitator should now be ready to obtain final agreement on whether the task list is a reasonably accurate and comprehensive description of the job. Normally, the members will quickly agree that the chart is complete, especially if the process has been followed, and will want to know how soon they can show a copy to their supervisor(s) and colleagues.

4.3.6. Select Tasks for Training (Step 6)

During this step the facilitator will help the team members to sort each task into categories of "no train," "pre-train," "train," or "overtrain" tasks. The facilitator should inform the team that some training can be effectively completed with non-formal training; these will be the "no-train" tasks. Other tasks will require documented training and evaluation in a formal training program ("train" and "overtrain"), while still others require formal training and evaluation "pre-train" just prior to task performance (for example, a task completed only every three years).

The team will apply criteria to determine the designation of each task.

4.3.6.1 Criteria for a "No Train" Task.

- High frequency of performance
- Low difficulty
- Low probability of error
- Low consequence of error
- Can be confidently performed with mentoring, informal OJT, job experience, and/or a job aid/procedure

4.3.6.2 Criteria for a "Pre-Train" Task.

- Extremely low frequency
- Time is available for training prior to task performance
- Worker needs training prior to task performance

4.3.6.3 Criteria for a "Train" Task.

- Moderate consequence of error
- Related task performance maintains proficiency on the task
- One-time training is sufficient for task performance
- Moderate frequency
- Can task be performed without use of a job aid/procedure?

4.3.6.4 Criteria for an "Overtrain" Task.

- Task requires frequent practice to maintain proficiency
- Proper task performance is critical to safety (extreme consequences)
- Generally low frequency

4.3.6.5 Selecting Tasks. The team will now categorize tasks within each duty area as "no train," "pre-train," "train," or "overtrain" based on the aforementioned criteria. The team will then come to consensus on each task. All tasks with similar classifications will be grouped together.

For further information, refer to Addendum B - Facilitator Guide.

4.4. Completing the Task List

It is important that the format that is chosen for the task list be professional looking and user friendly. The physical layout and appearance of the format adopted can do much to create a favorable impression for those who use the task list. Once the design is chosen, it should be used for all of the facility's table top analysis.

Once the task list with the tasks selected for training is printed, the team members should review the tasks and their selections one last time. When the review is complete the team should document their participation in the process approval of the task list. In addition to the team members, an empowered member of the instructional staff should also review and approve of the task list.

The final review should be made by facility management. A cognizant manager should approve the list showing management buy-in to the process and demonstrating their commitment.

These reviews close out this job analysis process, with the result being a self-validated task list with tasks selected for training. With proper coordination between management, the recorder, the instructional staff, and the team, the review and approval process can be an integral part of the session.

4.5. Follow-up Activities

One of the most important follow-up activities is to determine training program content. The task list will facilitate this activity. A table top team can be used in order to identify:

- the steps/activities involved,
- the related knowledge required,
- the attitudes involved,
- the performance standards expected,
- the tools and materials needed,
- the entry-level criteria, and
- the safety concerns.

This information will provide the basis for developing the instructional materials.

It is extremely important that each DOE facility conducting table-top job analysis carefully document the process that was used during the job analysis. A document which details the personnel involved, the task list prepared by the team, and the Task-to-Training Matrix (see ASAT Handbook) should be maintained by the facility for auditing purposes. The facility should also describe how the Task-to-Training Matrix will be updated.

TTJA has proven itself an effective, efficient, and viable alternative to traditional job analysis procedures. When properly used, TTJA is a powerful tool for evaluating an existing program or developing a new one.

5. NOTES ON USING ADDENDUMS

Much of the material that is included in the addendums is taken directly from courseware used to facilitate TTJA sessions at facilities. The Addendums are in separate files on this forum.

Addendum A is a Coordinator Guide. The Coordinator Guide is a self-study instrument designed to facilitate TTJA coordination. It includes information and recommendations to assist the person designated as Coordinator in scheduling and planning of a TTJA seminar. Time guidelines and recommended timelines for various events are included to assist the Coordinator. Self-checks are provided throughout the document to help ensure understanding of the process.

Addendum B is a Facilitator Guide. It also is a self-study guide for the appointed Facilitator. Prospective facilitators will get the information they need to perform their duties as facilitators with the guide. The Facilitator Guide also contains lesson plans associated with the orientation process. Training aids are not provided, since this addendum is for reference only.

Addendum C is a verb list that can be used when writing task statements.