

**Revised**

**NATIONAL**  
**GUIDELINES FOR**  
**APPRENTICESHIP STANDARDS**

for the

**INTERNATIONAL UNION OF OPERATING ENGINEERS**  
**NATIONAL TRAINING FUND**

for the occupation of

**STATIONARY ENGINEER**

**O\*NET-SOC CODE: 51-8021.02**

**RAPIDS CODE: 0536**

**DEVELOPED IN COOPERATION WITH THE**  
**U.S. DEPARTMENT OF LABOR**  
**OFFICE OF APPRENTICESHIP**

**APPROVED AND CERTIFIED BY THE**  
**U.S. DEPARTMENT OF LABOR**  
**OFFICE OF APPRENTICESHIP**

**BY: \_\_\_\_\_ /s/**  
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**CERTIFICATION DATE: July 6, 2011**  
**CERTIFICATION NUMBER: C-83460**

## **FOREWORD**

The International Union of Operating Engineers National Training Fund (IUOE NTF) recognizes the need for structured training programs to maintain the high level of skill and competence demanded in the occupation of Stationary Engineer. Registered apprenticeship is the most practical and sound training system available to meet that need, to develop individuals into skilled journeyworkers, and to ensure industry an adequate supply of skilled workers.

Title 29, Code of Federal Regulations (CFR), part 29, outlines the requirements for registration of acceptable apprenticeship programs for Federal purposes, and sets forth labor standards that safeguard the welfare of apprentices. Such registration may be by the U. S. Department of Labor, Office of Apprenticeship (OA), or by a State Apprenticeship Agency recognized by the OA as the appropriate body in that State for approval of local apprenticeship programs for Federal purposes. Title 29, CFR, part 30 sets forth the requirements for equal employment opportunity in apprenticeship to which all registered apprenticeship programs must adhere.

The purpose of these National Guidelines for Apprenticeship Standards (National Guideline Standards) is to provide policy and guidance to local Joint Apprenticeship Committees (JACs) in developing these Standards for Apprenticeship for local approval and registration. These National Guideline Standards developed by the NTF are certified by the U. S. Department of Labor, OA as substantially conforming to the requirements of Title 29, CFR parts 29 and 30. State Apprenticeship Agencies recognized by the OA to register local programs, and/or local laws and regulations, may impose additional requirements that must be addressed in the local apprenticeship standards.

Local Standards of Apprenticeship must be developed and registered by each JAC that undertakes to carry out an apprenticeship training program. The local Standards of Apprenticeship will be the local JAC's written plan outlining all terms and conditions for the recruitment, selection, employment, training, and supervision of apprentices as subscribed to by the local JAC, and must meet all the requirements of the Registration Agency.

The establishment of local apprenticeship programs under these National Guideline Standards will provide the Sponsor with a skilled and versatile work force at each of its locations by providing apprentices the opportunity to become journeyworkers through an organized and properly supervised program of training, practical experience and related instruction.

## **IUOE NTF**

The IUOE NTF is charged with development of National Guidelines for Apprenticeship Standards and having them certified by the U. S. Department of Labor, Office of Apprenticeship for use by local JACs.

The duties of the IUOE NTF include:

Assist and advise the local JACs on accepted practices for furthering sound apprenticeship procedures at the local level.

Act in advisory capacity to local JACs, and interpret the meaning and purpose of any clauses contained within the National Guideline Standards.

Meet on call of the Co-Chairs, to review the progress on apprenticeship in the industry.

Review local apprenticeship standards for conformity with the National Guideline Standards.

In general, to encourage and enforce the adoption and application at the local level of sound apprenticeship practices.

Except as otherwise specifically provided for in the National Guideline Standards, any disputes arising out of the application of the provisions of a local program, which are not resolved by the local JAC, will be subject to the established grievance procedure. By mutual agreement, the parties may waive the steps of the grievance procedure and refer a grievance directly to arbitration. However, complaints alleging violation of a sponsor's nondiscrimination and affirmative action responsibilities must be handled according to the procedures set forth under Title 29 CFR part 30.

## **DEVELOPMENT OF AFFIRMATIVE ACTION PLAN AND SELECTION PROCEDURES**

Equal employment opportunity is required of every registered apprenticeship program. Such requirements apply to the recruitment, selection, employment, and training of apprentices throughout their apprenticeship.

Those programs with five or more apprentices, or where there is a likelihood of five or more apprentices, must have a written Affirmative Action Plan and Selection Procedures that is approved by the Registration Agency as part of the Standards of Apprenticeship.

A sample Affirmative Action Plan and Selection Procedures are attached.

Representatives of the Registration Agency are available to assist the local JAC in developing their Standards of Apprenticeship, Affirmative Action Plan and Selection Procedures using the sample provided. Once developed, the Standards of Apprenticeship, as well as the Affirmative Action Plan and Selection Procedures must be submitted to the Registration Agency for approval and registration. Company Affirmative Action Plan's and Selection Procedures (hiring process) may be considered in lieu of utilizing the samples provided if they meet all of the requirements of Title 29, CFR part 30.

**OFFICIAL ADOPTION OF NATIONAL GUIDELINES**  
**FOR**  
**STATIONARY ENGINEERING APPRENTICESHIP STANDARDS:**

IUOE National Training Fund, hereby officially adopts these National Guidelines for Apprenticeship Standards on this \_\_\_\_\_ day of \_\_\_\_\_, 2011.

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**GENERAL PRESIDENT**  
**International Union of Operating**  
**Engineers, AFL-CIO**

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**EXECUTIVE DIRECTOR**  
**IUOE National Training Fund**

**(SAMPLE)**

**STANDARDS OF APPRENTICESHIP**

**DEVELOPED BY**

**(NAME OF LOCAL JAC)**

**FOR THE OCCUPATION OF**

**STATIONARY ENGINEER**

**O\*NET/SOC CODE: 51-8021.02**

**RAPIDS CODE: 0536**

**APPROVED BY**

**(REGISTRATION AGENCY)**

*These model National Guideline for Apprenticeship Standards are an example of how to develop apprenticeship standards that will comply with Title 29, CFR parts 29 and 30 when tailored to a sponsor's apprenticeship program. These model Standards do not create new legal requirements or change current legal requirements. The legal requirements related to apprenticeship that apply to registered apprenticeship programs are contained in Title 29, U.S.C. 50 and 29, CFR parts 29 and 30. Every effort has been made to ensure that the information in the model Apprenticeship Standards is accurate and up-to-date.*

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## **FOREWORD**

Experience has demonstrated that a practical and sound method of preparing for skilled craftsmanship is through planned apprenticeship providing for employment and training under actual job conditions by skilled workers and at wages commensurate with the apprentice's skill.

In addition, the apprentice's knowledge and understanding of the trade is broadened through participation in approved courses of related and supplemental training.

The (Insert the name of Local JAC) has established these Standards of Apprenticeship outlining all the terms and conditions for the qualifications, recruitment, selection, employment and training of apprentices.

This recognition has resulted in the development of these Standards of Apprenticeship. They were developed in accordance with the basic standards recommended by the U.S. Department of Labor, Office of Apprenticeship, as a basis from which the Sponsor can work to establish an apprenticeship training program that meets the particular needs of the area.

## **DEFINITIONS**

**APPRENTICE:** Any individual employed by the employer meeting the qualifications described in the Standards of Apprenticeship who has signed an Apprenticeship Agreement with the local Joint Apprenticeship Committee (JAC) providing for training and related instruction under these Standards, and who is registered with the Registration Agency.

**APPRENTICE ELECTRONIC REGISTRATION (AER):** Is an electronic tool that allows for instantaneous transmission of apprentice data for more efficient registration of apprentices and provides Program Sponsors with a faster turnaround on their submissions and access to their apprenticeship program data.

**APPRENTICESHIP AGREEMENT:** The written agreement between the apprentice and the JAC setting forth the responsibilities and obligations of all parties to the Apprenticeship Agreement with respect to the Apprentice's employment and training under these Standards. Each Apprenticeship Agreement must be registered with the Registration Agency.

**CERTIFICATE OF COMPLETION OF APPRENTICESHIP:** The Certificate of Completion of Apprenticeship issued by the Registration Agency to those registered apprentices certified and documented as successfully completing the apprentice training requirements outlined in these Standards of Apprenticeship.

**COLLECTIVE BARGAINING AGREEMENT:** The negotiated agreement between the Union and signatory employer that sets forth the terms and conditions of employment.

**COORDINATOR:** Means the person designated by the local JAC to perform the duties stated in the standards of apprenticeship.

**ELECTRONIC MEDIA:** Media that utilize electronics or electromechanical energy for the end user (audience) to access the content; and includes, but is not limited to, electronic storage media, transmission media, the Internet, extranet, lease lines, dial-up lines, private networks, and the physical movement of removable/transportable electronic media and/or interactive distance learning.

**EMPLOYER:** Means any person or organization employing an apprentice whether or not such person or organization is a party to an Apprenticeship Agreement with the apprentice.

**JOB CORPS CENTERS:** Any of the Federally-funded Job Corps Centers throughout the U.S. and Puerto Rico. Job Corps annually serves approximately 65,000 youth and young adults between 16-24 years of age. Sponsors who wish to hire Job Corps graduates trained in any occupation covered under these Standards, and who meets the minimum qualifications for apprenticeship, may do so via the *Direct Entry* provision

described in *Appendix D Selection Procedures. (if applicable)*

**JOINT APPRENTICESHIP COMMITTEE (JAC):** A JAC comprised of an equal number of representatives appointed by the Union and by the Employer in whose name these Standards of Apprenticeship will be registered.

**JOURNEYWORKER:** A worker who has attained a level of skill, abilities and competencies recognized within an industry as having mastered the skills and competencies required for the occupation.

**O\*NET-SOC CODE:** The Occupational Information Network (O\*NET) codes and titles are based on the new Standard Occupational Classification (SOC) system mandated by the federal Office of Management and Budget for use in collecting statistical information on occupations. The O\*NET classification uses an 8-digit O\*NET-SOC code. Use of the SOC classification as a basis for the O\*NET codes ensures that O\*NET information can be readily linked to labor market information such as occupational employment and wage data at the national, State, and local levels.

**ON-THE-JOB LEARNING (OJL):** Tasks learned on the job in which the apprentice must become proficient before a completion certificate is awarded. The learning must be through structured, supervised work experience.

**PROGRAM SPONSOR:** The local JAC in whose name the Standards of Apprenticeship will be registered, and which will have the full responsibility for administration and operation of the apprenticeship program.

**PROVISIONAL REGISTRATION:** Means the 1-year initial provisional approval of newly registered programs that meet the required standards for program registration, after which program approval may be made permanent, continued as provisional, or rescinded following a review by the Registration Agency, as provided for in the criteria describe in §29.3 (g) and (h).

**REGISTERED APPRENTICESHIP PARTNERS INFORMATION DATA SYSTEM (RAPIDS):** The Federal system which provides for the automated collection, retention, updating, retrieval and summarization of information related to apprentices and apprenticeship programs.

**REGISTRATION AGENCY:** Means the U.S. Department of Labor, Office of Apprenticeship or a recognized State Apprenticeship Agency that has responsibility for registering apprenticeship programs and apprentices; providing technical assistance; conducting reviews for compliance with Title 29, CFR parts 29 and 30 and quality assurance assessments.

**RELATED INSTRUCTION:** An organized and systematic form of instruction designed to provide the apprentice with the knowledge of the theoretical and technical subjects

related to the apprentice's occupation. Such instruction may be given in a classroom, through occupational or industrial courses, or by electronic media, or other forms of self-study approved by the Registration Agency.

**STANDARDS OF APPRENTICESHIP:** This entire document including all appendices and attachments hereto, and any future modifications or additions approved by the Registration Agency.

**SUPERVISOR OF APPRENTICE(S):** An individual designated by the program sponsor to supervise or have charge and direction of an apprentice.

**TIME-BASED OCCUPATION:** A time-based occupation requires a minimum of 2,000 hours of OJL and recommended 144 hours of related instruction, which includes an outline of the specific work processes and the approximate time requirement for each individual work process under that occupation. *(if applicable)*

**TRANSFER:** A shift of apprenticeship agreement from one program to another or from one employer within a program to another employer within that same program, where there is agreement between the apprentice and the affected apprenticeship committee or program sponsor.

**UNION:** Any of the Local Unions affiliated with the International Union of Operating Engineers and which is party to an appropriate labor agreement with employer(s).

## **SECTION I. - PROGRAM ADMINISTRATION (SAMPLE)**

The Local Joint Apprenticeship Committee (JAC) in whose name these Standards of Apprenticeship are registered shall be composed of an equal number of representatives appointed by the employer and the union.

The local JAC shall be responsible for:

- a. Establishing and registering Standards of Apprenticeship with the Registration Agency, and ensuring adherence to them.
- b. Establishing and maintaining rules and requirements governing the policies, administration, supervision, and training of apprentices. The rules and requirements shall be in conformity with the collective bargaining agreement and with these Apprenticeship Standards. A copy of such rules and requirements, and any changes to them, shall be provided to the Registration Agency and the apprentice.
- c. Determining the need for new apprentices, including when apprenticeship openings will be available and selecting apprentices in accordance with the Selection Procedures attached hereto and made a part of the Apprenticeship Standards.
- d. Initiating and signing all Apprenticeship Agreements for apprentices and forwarding them to the Registration Agency for approval and registration. In addition, the local JAC will notify the Registration Agency and other appropriate parties of the cancellation, suspension, extension, reinstatement, or completion of apprentices.
- e. Arranging for apprentices to get the required on-the-job learning and related technical instruction that will provide them with the diversity of training delineated in the attached Work Process Schedule and Related Instruction Outline.
- f. Monitoring and evaluating apprentices' progress, including the review of apprentices' records to insure apprentices are fulfilling their responsibilities under the program. The local JAC will review, approve and document all apprentice actions including hours, content, and progress of training on the job and in related instruction; step progressions; disciplinary actions; poor evaluations; corrective action plans; successful completions; cancellations; and any other performance or attendance-related issues. Written minutes of the meeting will be kept.
- g. Hearing and adjusting complaints regarding Apprenticeship Agreement violations.

- h. Certifying the apprentice has completed both the required on-the-job learning and related technical instruction, and submitting such certification to the Registration Agency with request for issuance of the Certificate of Completion of apprenticeship.
- i. Notifying the appropriate Registration Agency of all new apprentices to be registered, credit granted, suspensions for any reason reinstatements, extensions, completions and cancellations with explanation of causes and notice of completions of Apprenticeship Agreements.
- j. Provide apprentices with a copy of the written rules and policies and the apprentice will sign an acknowledgment receipt of same. This procedure will be followed whenever revisions or modifications are made to the rules and policies.

**SECTION II. - EQUAL OPPORTUNITY PLEDGE – Title 29 CFR 29.5(b)(21) and 30.3(b)**

The recruitment, selection, employment, and training of apprentices during their apprenticeship, shall be without discrimination because of race, color, religion, national origin, or sex. The local JAC will take affirmative action to provide equal opportunity in apprenticeship and will operate the apprenticeship program as required under Title 29 of the Code of Federal Regulations (CFR), part 30, as amended (insert state regulations here, if applicable).

**SECTION III. - AFFIRMATIVE ACTION PLAN – Title 29 CFR 29.5(b)(21) and 30.4**

If the Sponsor employs five or more apprentices, the local JAC will adopt an Affirmative Action Plan and Selection Procedures as required under Title 29, CFR part 30. It will be attached as Appendix C.

**SECTION IV. - QUALIFICATIONS FOR APPRENTICESHIP – Title 29 CFR 29.5(b)(10) (EXAMPLES)**

Applicants will meet the following minimum qualifications:

A. Age

Apprentices must not be less than 18 years of age.

B. Education

High school diploma or GED is required to apply to the apprenticeship program;

either one or the other is acceptable.

An applicant who is seventeen (17) years of age and is participating in a school-to-work program or equivalent and who otherwise meets all qualifications may be rated and ranked and placed on the list of eligible applicants. Such an applicant must be eighteen (18) years of age prior to being accepted into the apprenticeship program.

Applicants must submit a DD-214 to verify military training and/or experience if they are a veteran and wish to receive consideration for such training/experience.

C. Physical

Applicants will be physically capable of performing the essential functions of the apprenticeship program, with or without a reasonable accommodation, and without posing a direct threat to the health and safety of the individual or others.

Applicants will pass a **physical agility test, fitness test, or screen for the current illegal use of drugs (select all, some, or none, if applicable)** on acceptance into the program and prior to being employed.

D. Aptitude Test

Individual JACs may elect to have an aptitude test as part of the selection process.

**SECTION V. - SELECTION OF APPRENTICES – Title 29 CFR 30.5**

Selection into the apprenticeship program will be in accordance with the selection procedures made a part of these Standards (Appendix D).

**SECTION VI. - APPRENTICESHIP AGREEMENT – Title 29 CFR 29.3(d) and (e) and 29.5(b)(11)**

After an applicant for apprenticeship has been selected, but before employment as an apprentice or enrollment in related instruction, the apprentice will be covered by a written apprenticeship agreement (Appendix B) signed by the local JAC and the apprentice and approved by and registered with the Registration Agency. Such agreement will contain a statement making the terms and conditions of these standards a part of the agreement as though expressly written therein. A copy of each Apprenticeship Agreement will be furnished to the apprentice, the local JAC, the Registration Agency, and the employer and the union, if appropriate.

An additional copy of the Apprenticeship Agreement will be provided to the Veteran's State Approving Agency for those veteran apprentices desiring access to any benefits to which they are entitled.

Prior to signing the Apprenticeship Agreement, each selected applicant will be given an opportunity to read and review these Standards, the local JAC's written rules and policies, the Apprenticeship Agreement and the sections of the Collective Bargaining Agreement (CBA) that pertain to apprenticeship.

The Registration Agency will be advised within forty-five (45) days of the execution of each Apprenticeship Agreement and will be given all the information required for registering the apprentice.

**SECTION VII. - RATIO OF APPRENTICES TO JOURNEYWORKERS- Title 29 CFR 29.5(b)(7)**

A numeric ratio of apprentices to journeyworkers consistent with proper supervision, training, safety, and continuity of employment and applicable provisions in collective bargaining agreements, except where such ratios are expressly prohibited by the collective bargaining agreements. The ratio language must be specific and clearly described as to its application on the job site, workforce, department or plant. The ratio of apprentices to journeyworkers will be **(INSERT NUMBER)** apprentices to **(INSERT NUMBER)** journeyworkers.

**SECTION VIII. - TERM OF APPRENTICESHIP – Title 29 CFR 29.5(b)(2)**

The term of the occupation shall be a minimum of three (3) years of OJL (and not less than 6000 OJL hours and 432 hours of classroom instruction. Sample Work Process Schedule and Related Instruction Outline are in Appendix A. Full credit will be given for the probationary period.

**SECTION IX. - PROBATIONARY PERIOD – Title 29 CFR 29.5(b)(8), (b)(20)**

All applicants selected for apprenticeship will serve a probationary period of not less than the 6 months or 1000 hours of OJL.

During the probationary period either the apprentice or the local JAC may terminate the Apprenticeship Agreement, without stated cause, by notifying the other party in writing. The records for each probationary apprentice will be reviewed prior to the end of the probationary period. Records may consist of periodic reports regarding progression made in both the OJL and related instruction, and any disciplinary action taken during the probationary period.

Any probationary apprentice evaluated as satisfactory after a review of the probationary period will be given full credit for the probationary period and continue in the program.

After the probationary period the Apprenticeship Agreement may be canceled at the request of the apprentice, or may be suspended or canceled by the local JAC for reasonable cause after documented due notice to the apprentice and a reasonable opportunity for corrective action. In such cases, the local JAC will provide written notice to the apprentice and to the Registration Agency of the final action taken.

## **SECTION X. - HOURS OF WORK**

Apprentices will generally work the same hours as journeyworkers, except that no apprentice will be allowed to work overtime if it interferes with attendance in related instruction classes.

Apprentices who do not complete the required hours of OJL during a given segment will have the term of that segment extended until the required number of hours of training are accrued.

## **SECTION XI. - APPRENTICE WAGE PROGRESSION – Title 29 CFR 29.5(b)(5)**

Apprentices will be paid a progressively increasing schedule of wages during their apprenticeship based on the acquisition of increased skill and competence on the job and in related instruction. Before an apprentice is advanced to the next segment of training or to journeyworker status, the local JAC will evaluate all progress to determine whether advancement has been earned by satisfactory performance in their OJL and in related instruction courses. In determining whether satisfactory progress has been made, the local JAC will be guided by the work experience and related instruction records and reports.

The progressive wage schedule will be an increasing percentage of the journeyworker wage rate as established in the CBA. The percentages that will be applied to the applicable journeyworker rate are shown on the attached Sample Work Process Schedule and Related Instruction Outline (Appendix A). In no case will the starting wages of apprentices be less than that required by any minimum wage law which may be applicable.

## **SECTION XII. - CREDIT FOR PREVIOUS EXPERIENCE – Title 29 CFR 29.5(b)(12) and 30.4(c)(8)**

The local JAC may grant credit towards the term of apprenticeship to new apprentices who demonstrate previous acquisition of skills or knowledge equivalent to that which would be received under these Standards.

Apprentice applicants seeking credit for previous experience gained outside the supervision of the local JAC must submit the request at the time of application and furnish such records, affidavits, and other (insert requirements) to substantiate the claim. Applicants requesting such credit who are selected into the apprenticeship program will start at the beginning wage rate. The request for credit will be evaluated and a determination made by the local JAC during the probationary period when actual on-the-job and related instruction performance can be examined. Prior to completion of the probationary period, the amount of credit to be awarded will be determined after review of the apprentice's previous work and training/education record and evaluation of the apprentice's performance and demonstrated skill and knowledge during the probationary period.

An apprentice granted credit will be advanced to the wage rate designated for the period to which such credit accrues. The Registration Agency will be advised of any credit granted and the wage rate to which the apprentice is advanced.

The granting of advanced standing will be uniformly applied to all apprentices.

### **SECTION XIII. - WORK EXPERIENCE – Title 29 CFR 29.5(b)(3) and 30.8**

During the apprenticeship the apprentice will receive OJL and related instruction in all phases of the occupation necessary to develop the skill and proficiency of a skilled journeyworker. The OJL will be under the direction and guidance of qualified journeyworkers.

### **SECTION XIV. - RELATED INSTRUCTION – Title 29 CFR 29.5(b)(4)**

During each segment of training, each apprentice is required to attend classes in subjects related to the job as outlined in Appendix A. For each occupation, the recommended term of apprenticeship will include no less than 144 hours of related instruction for the Stationary Engineer for each year of the apprenticeship. Apprentices agree to take such courses as the JAC deems advisable. The JAC will secure the instructional aids and equipment it deems necessary to provide quality instruction. In cities, towns or areas having no vocational school or other schools that can furnish related instruction; the apprentice may be required to take an alternate form of instruction that meets the approval of the Sponsor and the Registration Agency.

Apprentices (**local JAC inserts "will" or "will not"**) be paid for hours spent attending related instruction classes.

If applicable, the local JAC will inform each apprentice of the availability of college credit through the (**insert the names of educational institutions which will offer college credit**).

Any apprentice who is absent from related instruction classes, unless officially excused, will satisfactorily complete all course work missed before being advanced to the next period of training. In cases of failure of an apprentice to fulfill the obligations regarding related instruction (or OJL) training without due cause, the local JAC will take appropriate disciplinary action and may terminate the Apprenticeship Agreement after due notice to the apprentice and opportunity for corrective action.

To the extent possible, related instruction will be closely correlated with the practical experience and training received on-the-job. The local JAC will monitor and document the apprentice's progress in related instruction classes.

The local JAC will secure competent instructors whose knowledge, experience, and ability to teach will be carefully examined and monitored. If applicable, when possible, the local JAC may require the instructors to attend the **(insert names of institutions that will provide training)**.

#### **SECTION XV. - SAFETY AND HEALTH TRAINING – Title 29 CFR 29.5(b)(9)**

All apprentices will receive instruction in safe and healthful work practices both on-the-job and in related instruction that are in compliance with the Occupational Safety and Health Standards promulgated by the Secretary of Labor under 29 U.S.C. 651 et seq., as amended, dated December 29, 1970, and subsequent amendments to that law, or State Standards that have been found to be at least as effective as the Federal Standards.

Apprentices will be taught that accident prevention is very largely a matter of education, vigilance, and cooperation and that they should strive at all times to conduct themselves in their work to ensure their own safety and that of their fellow workers.

#### **SECTION XVI. - SUPERVISION OF APPRENTICES – Title 29 CFR 29.5(b)(14)**

The local JAC and employer will be responsible for the training of the apprentice on the job. Apprentices will be under the general supervision of the employer and under the direct supervision of the journeyworker to whom they are assigned. The supervisor of apprentice(s) designated by the employer shall, with the advice and assistance of the local JAC, be responsible for the apprentice's work assignments ensuring the apprentice is working under the supervision of a skilled journeyworker, evaluation of work performance, and completion and submittal of progress reports to the local JAC.

No apprentice will be allowed to work without direct journeyworker supervision.

**SECTION XVII. - RECORDS AND EXAMINATIONS – Title 29 CFR 29.5(b)(6)**

Each apprentice may be responsible for maintaining a record of his/her work experience/training on-the-job and in related instruction and for having this record verified by his/her supervisor at the end of each week. The apprentice will authorize an effective release of their completed related instruction records from the local school authorities to the local JAC. The record cards and all data, written records of progress evaluations, corrective and final actions pertaining to the apprenticeship, will be maintained by and will be the property of the local JAC. This record will be included in each apprentice's record file maintained by the local JAC.

Before each period of advancement, or at any other time when conditions warrant, the local JAC will evaluate the apprentice's record to determine whether he/she has made satisfactory progress. If an apprentice's related instruction or on-the-job progress is found to be unsatisfactory, the local JAC may determine whether the apprentice will continue in a probationary status, or require the apprentice to repeat a process or series of processes before advancing to the next wage classification. In such cases, the local JAC will initiate a performance improvement plan with the apprentice.

Should it be found that the apprentice does not have the ability or desire to continue the training to become a journeyworker, the local JAC will, after the apprentice has been given adequate assistance and opportunity for corrective action, terminate the Apprenticeship Agreement.

**SECTION XVIII. - MAINTENANCE OF RECORDS – Title 29 CFR 29.5(b)(23) and 30.8(e)**

The local JAC will maintain for a period of five (5) years from the date of last action, all records relating to apprentice applications (whether selected or not), the employment and training of apprentices, and any other information relevant to the operation of the program. This includes, but is not limited to, records on the recruitment, application and selection of apprentices, and records on the apprentice's job assignments, promotions, demotions, layoffs, terminations, rate of pay, or other forms of compensation, hours of work and training, evaluations, and other relevant data. The records will permit identification of minority and female (minority and non-minority) participants. These records will be made available on request to the Registration Agency.

**SECTION XIX. - CERTIFICATE OF COMPLETION OF APPRENTICESHIP – Title 29 CFR 29.5(b)(15)**

Upon satisfactory completion of the requirements of the apprenticeship program as established in these Standards, the local JAC will so certify in writing to the Registration Agency and request that a Certificate of Completion of Apprenticeship be awarded to

the completing apprentice(s). Such requests will be accompanied by the appropriate documentation for both the OJL and the related instruction as may be required by the Registration Agency.

**SECTION XX. - NOTICE TO REGISTRATION AGENCY – Title 29 CFR 29.3(2)(d) and (e) and 29.5(b)(19)**

The Registration Agency will be notified within forty-five (45) days of all new apprentices to be registered, credit granted, suspensions for any reason, reinstatements, extensions, modifications, completions, cancellations, and terminations of Apprenticeship Agreements and causes.

**SECTION XXI. - CANCELLATION AND DEREGISTRATION – Title 29 CFR 29.5(b)(18)**

These Standards will, upon adoption by the local JAC be submitted to the Registration Agency for approval. Such approval will be acquired before implementation of the program.

**(INSERT NAME OF LOCAL JAC)** reserves the right to discontinue at any time the apprenticeship program set forth herein. The Registration Agency will be notified promptly in writing of any decision to cancel the program.

Deregistration of these Standards may be initiated by the Registration Agency for failure of the local JAC to abide by the provisions herein. Such deregistration will be in accordance with the Registration Agency's regulations and procedures.

Within fifteen (15) days of cancellation of the apprenticeship program (whether voluntary or involuntary), the local JAC will notify each apprentice of the cancellation and the effect of same. This notification will conform to the requirements of Title 29, CFR part 29.8.

**SECTION XXII. - AMENDMENTS OR MODIFICATIONS – Title 29 CFR 29.5(b)(18)**

These Standards may be amended or modified at any time by joint agreement between **(INSERT NAME OF SPONSORS AND UNION)** provided that no amendment or modification adopted will alter any Apprenticeship Agreement in force at the time without the consent of all parties. Such amendment or modification will be submitted to the local JAC for approval and will then be submitted to the Registration Agency for approval and registration prior to being placed in effect. A copy of each amendment or modification adopted will be furnished to each apprentice to whom the amendment or modification applies.

**SECTION XXIII. - ADJUSTING DIFFERENCES/COMPLAINT PROCEDURE - Title 29 CFR 29.5(b)(22), 29.7(k) and 30.11**

The local JAC will have full authority to supervise the enforcement of these Standards. Its decision will be final and binding on the employer, the union, and the apprentice, unless otherwise noted below.

If an applicant or an apprentice believes an issue exists that adversely affects his/her participation in the apprenticeship program or violates the provisions of the Apprenticeship Agreement or Standards, relief may be sought through one or more of the following avenues, based on the nature of the issue:

**Title 29 CFR 29.7(k)**

For issues regarding wages, hours, working conditions, and other issues covered by the CBA, apprentices may seek resolution through the applicable Grievance and Arbitration procedures contained in the Articles of the CBA.

The local JAC will hear and resolve all complaints of violations concerning the Apprenticeship Agreement and the registered Apprenticeship Standards, for which written notification is received within fifteen (15) days of violations. The local JAC will make such rulings as it deems necessary in each individual case and within thirty (30) days of receiving the written notification. Either party to the Apprenticeship Agreement may consult with the Registration Agency for an interpretation of any provision of these Standards over which differences occur. The name and address of the appropriate authority to receive, process and make disposition of complaints is: (local JAC should insert applicable information here).

**Title 29 CFR 30.11**

Any apprentice or applicant for apprenticeship who believes that he/she has been discriminated against on the basis of race, color, religion, national origin, or sex, with regard to apprenticeship or that the equal opportunity standards with respect to his/her selection have not been followed in the operation of an apprenticeship program, may personally or through an authorized representative, file a complaint with the Registration Agency or, at the apprentice or applicant's election, with the private review body established by the program sponsor (if applicable).

The complaint will be in writing and will be signed by the complainant. It must include the name, address, and telephone number of the person allegedly discriminated against, the Program Sponsor involved, and a brief description of the circumstances of the failure to apply equal opportunity standards.

The complaint must be filed not later than one hundred eighty (180) days from the date of the alleged discrimination or specified failure to follow the equal opportunity

standards, and in the case of complaints filed directly with the review body designated by the program sponsor to review such complaints, any referral of such complaint by the complainant to the Registration Agency must occur within the time limitation stated above or thirty (30) days from the final decision of such review body, whichever is later. The time may be extended by the Registration Agency for good cause shown.

Complaints of discrimination in the apprenticeship program may be filed and processed under Title 29, CFR, part 30, and the procedures as set forth above.

The local JAC will provide written notice of their complaint procedure to all applicants for apprenticeship and all apprentices.

#### **SECTION XXIV. - COLLECTIVE BARGAINING AGREEMENT (CBA) – Title 29 CFR 29.11**

Nothing in this part or in any apprenticeship agreement will operate to invalidate:

- (a) Any apprenticeship provision in any collective bargaining agreement between employers and employees establishing higher apprenticeship standards; or
- (b) Any special provision for veterans, minority persons, or women in the standards, apprentice qualifications or operation of the program, or in the apprenticeship agreement, which is not otherwise prohibited by law, Executive Order, or authorized regulation.

#### **SECTION XXV. - TRANSFER OF AN APPRENTICE AND TRAINING OBLIGATION - Title 29 CFR 29.5(13)**

The transfer of an apprentice between apprenticeship programs and within an apprenticeship program must be based on agreement between the apprentice and the affected apprenticeship committees or program sponsors, and must comply with the following requirements:

- i. The transferring apprentice must be provided a transcript of related instruction and on-the-job learning by the committee or program sponsor;
- ii. Transfer must be to the same occupation; and
- iii. A new apprenticeship agreement must be executed when the transfer occurs between the program sponsors.

If the local JAC is unable to fulfill his/her training obligation due to lack of work or failure to conform to these Standards the local JAC will make every effort to refer the apprentice with his/her consent to another employer for placement into another

registered apprenticeship program. This will provide the apprentice an opportunity for continuous employment and completion of their apprenticeship program. The apprentice must receive credit from the JAC for the training already satisfactorily completed.

## **SECTION XXVI. - RESPONSIBILITIES OF THE APPRENTICE**

Apprentices, having read these Standards formulated by the local JAC and signed an Apprenticeship Agreement with the JAC, agree to all the terms and conditions contained therein and agree to abide by the JAC's rules and policies, including any amendments, serve such time, perform such manual training, and study such subjects as the JAC may deem necessary to become a skilled Stationary Engineer.

In signing the Apprenticeship Agreement, apprentices assume the following responsibilities and obligations under the apprenticeship program:

- A. Perform diligently and faithfully the work of the occupation and other pertinent duties assigned by the local JAC and the employer in accordance with the provisions of these Standards.
- B. Respect the property of the employer and abide by the working rules and regulations of the employer, union and the local JAC.
- C. Attend and satisfactorily complete the required hours in the OJL and in related instruction in subjects related to the occupation as provided under these Standards.
- D. Maintain and make available such records of work experience and training received on the job and in related instruction as may be required by the local JAC.
- E. Develop and practice safe working habits and work in such a manner as to assure his/her personal safety and that of other workers.
- F. Work for the employer to whom the apprentice is assigned for the completion of apprenticeship, unless reassigned to another employer or the Apprenticeship Agreement is terminated by the local JAC.
- G. Conduct themselves at all times in a creditable and ethical manner, realizing that much time, money, and effort are spent to afford them an opportunity to become a skilled journeyworker.

## **SECTION XXVII. – TECHNICAL ASSISTANCE**

Technical Assistance such as that from the U.S. Department of Labor, Office of Apprenticeship, State Apprenticeship Agencies, and vocational schools may be requested to advise the local JAC.

The local JAC is encouraged to invite representatives from industry, education, business, private and/or public agencies to provide consultation and advice for the successful operation of their training program.

**SECTION XXVIII. - OFFICIAL ADOPTION OF APPRENTICESHIP STANDARDS:**

The *(name of local JAC)* hereby adopts these Standards of Apprenticeship on this Day of \_\_\_\_\_, (Insert Month/Year).

REPRESENTING THE *(Name of the JAC)*:

\_\_\_\_\_  
Signature of Local JAC Chairperson

\_\_\_\_\_  
Signature of Labor

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Printed Name

*Sponsor(s) may designate the appropriate person(s) to sign the Standards on their behalf*

## **Appendix A**

WORK PROCESS SCHEDULE  
STATIONARY ENGINEER  
O\*NET-SOC CODE: 51-8021.02 RAPIDS CODE: 0536

This work process schedule is attached to and a part of these Standards for the above identified occupation.

### **1. TERM OF APPRENTICESHIP**

The term of the occupation shall be 3 years with an OJL attainment of not less than 6000 OJL hours supplemented by the required hours of related instruction.

### **2. RATIO OF APPRENTICES TO JOURNEYWORKERS**

The ratio of apprentices to journeyworkers is established in the applicable collective bargaining agreement, or as agreed by the JAC. This ratio will be defined as no more than one (1) apprentice for every five (5) journeyworkers.

### **3. APPRENTICE WAGE SCHEDULE**

Apprentices shall be paid a progressively increasing schedule of wages based on a percentage of the current journeyworker wage rate, as follows or as per the collective bargaining agreement.

Wages shall be as established in the agreement between the Union and the employers with whom it shall have executed collective bargaining agreements. At no time will an apprentice receive below the Federal minimum wage. The wage rate progression for apprentices is as follows:

First half/first year	50% of employer's engineer's rate
Second half/first year	55%
First half/second year	60%
Second half/second year	65%
First half/third year	70%
Second half/third year	75%
First half/fourth year	80%
Second half/fourth year	85%

### **4. SCHEDULE OF WORK EXPERIENCE** (See attached Work Process Schedule)

The Sponsor may modify to the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

### **5. SCHEDULE OF RELATED INSTRUCTION** (See attached Related Instruction Outline)

WORK PROCESS SCHEDULE  
 STATIONARY ENGINEER  
 O\*NET-SOC CODE: 51-8021.02 RAPIDS CODE: 0536

1.	Electrical control and distribution .....	800
2.	Refrigeration systems .....	1250
	Commercial	
	Industrial	
3.	Air conditioning systems .....	1250
	Repair/maintenance operation	
	CFC Training & Certification	
4.	Boilers .....	1250
	Low-pressure systems	
	High-pressure systems	
	Repair/maintenance operation	
5.	Air handling systems .....	1250
6.	Industrial equipment .....	800
	Utilization	
	Maintenance/repair	
7.	Chemical treatment of water systems .....	800
8.	Fuels and fuel technology .....	600
	Environmental considerations	
Total		8000

Hours worked by the apprentice over and above the required minimum of 8000 hours shall be distributed over this schedule in the same ratio allotted each subject area in the preceding breakdown.

These schedules are to be considered flexible and may be revised by the JAC to accommodate any condition and may, with the approval of the NTF, be applied interchangeably among the different apprentice classifications.

RELATED INSTRUCTION OUTLINE  
STATIONARY ENGINEER  
O\*NET-SOC CODE: 51-8021.02RAPIDS CODE: 0536

**FIRST-YEAR**  
**(144 hours)**

**FIRST HALF**  
**(72 hours)**

<b>Basic Mathematics</b> .....	<b>14.4</b>
1. Whole Numbers .....	6
a) Number Line	
b) Real Numbers	
c) Basic Arithmetic Functions	
d) Absolute Numbers	
2. Common Fractions .....	8.4
a) Simple Fractions	
b) Conversion To Decimal	
c) Proper & Improper Fractions	
d) Mixed Numbers	
e) Complex Fractions	
f) Arithmetic Functions With Fractions	
i) Addition & Subtraction	
(1) Common Divisor	
ii) Multiplication & Division	
(1) Lowest Common Denominator	
iii) Proportions And Percentages	
(1) Discount	
(2) Commission	
(3) Interest	
(4) Profit & Loss	
<b>Introduction to Boilers</b> .....	<b>14.4</b>
1. Boiler Definition .....	3.5
2. Basic Terms .....	1
Btu, Radiation, Conduction & Convection	
3. Classifications .....	1.4
A. Water Tube	
B. Fire Tube	
4. Accessories .....	4
A. Superheaters	
B. Steam Separators	

C. Heat Recovery	
i. Preheater	
ii. Economizers	
D. Basic Safety	
Devices, LWCO, Safety Valves, Etc.	
E. Basic Operation	
i. Firing	
ii. Water Cycle	
iii. Fuel Cycle	
5. Basic Construction .....	2
A. Container Construction	
B. Furnace Construction	
6. Industrial & Utility Boilers .....	2.5
A. Design	
B. Operation	
<b>Algebra &amp; Geometry .....</b>	<b>14.4</b>
1. Roots & Squares .....	1.9
2. Powers .....	1.5
3. Algebraic Expressions .....	2
4. Equations Using Algebra .....	3
A. Addition & Subtraction	
B. Multiplication & Division	
5. Geometry .....	6
A. Squares	
B. Rectangles	
C. Circles	
D. Angles & Triangles	
E. Formulas For Area, Circumference, Etc.	
F. Interpolation	
<b>Boiler Accessories .....</b>	<b>14.4</b>
1. Water Column .....	1.5
A. Gauge Glass	
B. Try Cocks	
2. Fusible Plugs 1	
A. Fireside	
B. Waterside	
3. Steam Gauges .....	1
A. Siphon	
B. Bourdon Tube	

4. Feedwater Regulators .....	1.5
A. Float	
B. Thermohydraulic	
C. Thermostatic Expansion	
5. Safety Valves .....	1.5
A. Code (ASME)	
B. Testing	
C. Construction	
D. Operation	
6. Blowdown Apparatus .....	1.4
A. Surface Blowdown	
B. Bottom Blowdown	
C. Flash Tank	
7. Non-Return Valves .....	1
Operation	
8. Steam Headers .....	1
A. Construction	
B. Purpose	
9. Soot Blowers .....	1
A. Operation	
B. Design	
10. Valves .....	1.5
A. Globe	
B. Gate	
C. Balanced Valve	
D. Check Valves	
E. Reducing	
F. Stop Cocks	
11. Instruments And Automatic Combustion Control .....	2
A. Draft Gauge	
B. Pressure Gauges	
C. Temperature Indicators	
D. Automatic Controls	
i. On-Off	
ii. Postponing	
iii. Metering	

<b>Boiler Design and Construction .....</b>	<b>14.4</b>
1. Materials .....	2
2. Stresses .....	2
A. Tubes	
B. Shell	
C. Drums	
3. Drum & Shell Construction .....	1
4. Rivets And Riveted Joints .....	1
5. Welded Construction	
6. Stays .....	1.5
Types	
7. Fittings .....	1.5
8. Assembly .....	1.4
9. Heating Surface .....	2
A. Tubes	
B. Shells	
C. Tube Sheets	
10. Steaming Capacity .....	2

**SECOND HALF**  
**(72 hours)**

<b>Combustion of Fuel .....</b>	<b>26.5</b>
1. Requirements .....	1.5
2. Theory .....	3
A. Absolute Pressure	
B. Constant Temperature	
C. Constant Volume	
D. Constant Pressure	
E. Atoms & Molecules	
F. Combustion	
i. Carbon	
ii. Hydrogen	
iii. Sulfur	
G. Perfect Combustion	
H. Complete Combustion	
I. Incomplete Combustion	
J. Excess Air	
3. Air Supply .....	4
A. Draft	
B. Draft Gauge	
C. Forced	
D. Induced	
E. Balanced	
F. Induced Draft Fans Versus Chimneys	
4. Coal .....	6
A. Origination	
B. Composition	
Proximate Analysis	
C. Heating Value	
D. Ultimate Analysis	
E. Coking	
F. Soft Coal	
G. Hard Coal	
H. Moisture	
I. Other Characteristics	
5. Fuel Oil .....	6
A. Origination	
B. Characteristics	
C. Specific Gravity	
API Scale	
D. Viscosity	
E. Heating Valves	
F. Types	
Classes Or Comm. Etc.	

G. Combustion	
6. Gas .....	6
A. Origination	
B. Characteristics	
C. Make-Up	
D. Heating Valves	
E. Types	
<b>Operation and Maintenance of Steam Boilers .....</b>	<b>26.5</b>
1. Placing Boilers In Service .....	3
A. Hydrostatic Test	
B. Boil Out	
2. Normal Operation .....	10
A. Automatic Control	
B. Manual Control	
C. Feed Water Regulators	
D. Scale	
E. Corrosion	
F. Carry Over	
G. Foaming	
H. Priming	
I. Caustic Embrittlement	
J. Water Treatment	
i. External	
(1) Zeolite Softener	
(2) Demineralizer	
(3) Hot Process Lime-Soda-Ash	
(4) Evaporator	
ii. Internal	
(1) Chemicals	
(2) Feed Water Heaters	
(3) Blowdown	
K. Boiler & Fuel Efficiencies	
i. Formulas	
ii. Losses	
3. Emergencies .....	2.5
Procedures	
4. Banking .....	2
5. Maintenance .....	3
A. Fireside	
B. Waterside	
6. Inspections .....	2
Preparation	

7. Repairs .....	4
A. Tubes	
B. Drums	
C. Baffles	
D. Refractory Walls	
<b>Safety and First Aid .....</b>	<b>10</b>
1. Precautions .....	1
2. Common Sense .....	3
A. Storage Of Chemicals	
B. Storage Of Fuel	
3. Fire Protection .....	3
A. Extinguisher	
B. Boiler Safety	
4. Personal Safety .....	3
A. First Aid	
B. CPR	
<b>Labor Movement .....</b>	<b>6</b>
1 History .....	2
A. AFL-CIO	
B. Stationary Engineers	
2 Current Status .....	2
3 Future Growth .....	2
<b>Review .....</b>	<b>3</b>

**SECOND-YEAR  
(144 hours)**

**FIRST HALF  
(72 hours)**

<b><i>Fundamentals of Air Conditioning</i></b> .....	<b>21</b>
1. Temperature And Heat .....	3
2. Measurements .....	6
3. Basic Physics .....	12
A. States Of Matter	
B. Pressure	
C. Forces	
D. Energy	
E. BTU, Therm, Calorie	
F. Sensible, Specific, Latent Heat	
G. Heat Transfer	
H. Enthalpy	
I. Boyles Law	
J. Charles Law	
<b><i>Air Conditioning Components</i></b> .....	<b>21</b>
1 Basic Cycle Design And Operation .....	10.5
2 Components .....	10.5
A. Evaporator	
B. Compressor	
C. Condensers	
i. Air-Cooled	
ii. Water Cooled	
iii. Evaporative Condensing	
D. Receiver	
E. Metering Devices	
<b><i>Refrigerants</i></b> .....	<b>9</b>
1. Types .....	3
2. Handling .....	3
3. Safety .....	3

<b>Air Conditioning Design and Construction .....</b>	<b>21</b>
1. Evaporators .....	3
2. Compressors .....	6
A. Types	
B. Capacity Control	
C. Lubrication	
3. Condensers .....	6
A. Types	
B. Cooling Towers	
C. Evaporative Condensing	
4. Receivers .....	3
5. Metering Devices .....	3
Types	

**SECOND HALF  
(72 hours)**

**Refrigeration and Air-Conditioning ..... 72**

- 1. Accessories ..... 6
  - A. Accumulator
  - B. Filter Devices
  - C. Service Valves
  - D. Oil Separator
  
- 2. Controls ..... 6
  - A. Motors Controls
  - B. Safeties
    - i. Low Temperature
    - ii. Low Pressure
    - iii. High Pressure
    - iv. Rupture Disk
  
- 3. Physics Of Air Conditioning ..... 6
  - A. Enthalpy Chart
  - B. Psychometric Chart
  
- 4. Refrigerant System Operations ..... 9
  - A. Comparison To Reciprocating
  - B. Superheat
  - C. Oil Traps
  
- 5. Centrifugal Refrigeration ..... 9
  - A. Comparison To Reciprocating
  - B. Designs
  - C. Operations
  - D. Parts
  
- 6. Absorption Refrigeration ..... 6
  - A. Comparison To Mechanically Operated
  - B. Design
  - C. Basic Operation
  - D. Parts
  
- 7. Heat Pumps ..... 9
  - A. Basic Cycle
  - B. Design
  - C. Basic Operation
  - D. Parts
  
- 8. Basic Control Electricity ..... 6
  - A. Wiring Of Controls
  - B. Schematics

9. Safety .....	6
A. Personal	
B. Equipment	
10. CFC Training And Certification (Section 608 Of The EPA Clean Air Act Of 1990) .....	9

**THIRD-YEAR  
(144 hours)**

**FIRST HALF  
(72 hours)**

<b>Electricity .....</b>	<b>72</b>
1. Basic Electricity .....	6
Fundamentals	
i. Safety	
ii. Circuits, Electrons, Batteries, Symbols, Atoms	
2. Sources Of Electricity .....	6
A. Chemical	
B. Light	
C. Pressure	
D. Heat	
E. Magnetism	
i. Generators, Alternators	
ii. Principles Of Magnetism	
3. Conductors And Insulators .....	6
A. Wires, Fuses, Circuit Breakers	
B. Insulators	
4. Ohm's Law .....	9
A. Electromotive Force	
B. Current	
C. Resistance	
D. Watt, Kilowatt, kWh	
5. Series Alternating Current And Direct Current Circuits .....	12
A. Calculation Of Current And Direct Current Circuits	
B. Ohm's Law	
6. Parallel Alternating Current And Direct Current Circuits .....	12
Calculation Of Current And Voltage Drops	
i. Thevenins Equivalent Theorem	
ii. Voltage Driver Theorem	
7. Series And Parallel Circuits .....	9
Calculations	
8. Resistors And Capacitors .....	12
Resistors	
i. Symbols, Construction	
ii. Thermistors	

**SECOND HALF**  
**(72 hours)**

<b>Electricity .....</b>	<b>72</b>
1 Meters .....	9
A. Types	
B. Uses	
C. Reading Meters	
2 Alternating Current Voltages .....	15
A. Sine Wave	
B. How Alternating Current Is Produced	
C. Sine Wave Cycle	
D. Frequency, Period, Amplitude	
E. Peak Voltage	
F. RMS	
G. Current - Voltage Phase Relationship	
H. Power Factor	
3 Electromagnetic Induction .....	9
A. EMF In A Conductor	
B. Induced EMF	
C. Inductance	
D. Transformers	
i. Construction	
ii. Uses	
4 Motors And Motor Circuits .....	15
A. Alternating Current	
i. Overview	
ii. Characteristics	
iii. Advantages And Disadvantages	
B. Direct Current	
i. Overview	
ii. Characteristics	
iii. Advantages And Disadvantages	
5 Delta And Wye Winding Configurations For Motor And Generating Systems ....	15
A. Delta To Wye Conversions	
i. Mathematical Analysis	
ii. Number Of Poles	
6 Safety .....	9
A. Stationary Engineers Environmental Health & Safety Training	
B. Precautions	
C. Fire Protection	
Extinguishers	
D. Personal Safety	

**FOURTH-YEAR  
(144 hours)**

**FIRST HALF  
(72 hours)**

***Direct Digital Controls and Building Automation Systems..... 36***

- 1. Control Fundamentals ..... 3
  - A. Control Devices
  - B. Basic Control System Components
  - C. Function Of Sensors  
    Thermistors, Humidity Sensors, Pressure Sensors
  
- 2. Control Systems ..... 3
  - A. Control Linkages And Their Function
  - B. Direct And Reverse Acting Controls
  - C. Normally Open And Normally Closed Devices
  - D. Basic Control Actions Of A Control System
  - E. Control Actions
    - i. Two Position
    - ii. Floating Control
    - iii. Proportional Control
  
- 3. Interfacing Sensors And Actuators ..... 6
  - A. Basic Computer Control Systems
    - i. Control Points
    - ii. Sensors
    - iii. Signal Conditioning
    - iv. Transducer And Transmitters
  - B. Types Of Temperature And Humidity Sensors
  - C. Flow Indicators And Orifice Plates
  - D. Flow Meters
  
- 4. Microprocessors ..... 6
  - A. Automation
    - i. Energy Management
    - ii. Central Processing
    - iii. Stand-Alone Unit
    - iv. Networking
  - B. Logic And Logic Gates
  - C. Flip-Flop Logic Devices
  - D. Major PC Components
  - E. Register And Address Computer Functions
  - F. Arithmetic/Logic Functions.

5. Programmable Controllers .....	6
A. PC Programming	
B. Ladder Diagrams	
C. Relay Diagrams	
D. Examine Instructions	
2 Types	
E. Output Instructions	
3 Types	
F. Branch Instructions	
6. DDC Programming Methods And Configurations .....	6
A. PC Vs. DDC	
B. Centralized Controls	
C. Modem Function	
D. Layout And Purpose Of Flow Charts	
E. Flow Chart Symbols	
F. Keyboard Functions	
i. Command Keys	
ii. Cursor Keys	
iii. Enter Key	
7. DDC Applications & Design .....	3
A. DDC Operation	
B. DDC Compared To Electromechanical Or Solid State Control	
C. Three Operation Modes	
i. Demand Mode	
ii. Manual Mode	
iii. Schedule Mode	
8. Pneumatic Control Systems .....	3
A. The Air Supply	
B. Pneumatic Controllers	
C. Pneumatic Relays And Final Controllers	
<b>HVAC Testing and Balancing .....</b>	<b>36</b>
1. RPM & Pressure Instruments .....	2
A. Five Types Of Rpm Instruments	
i. Direct Contact-Manually Timed	
ii. Direct Contact-Automatically Timed	
iii. Direct Contact-Instantaneous Reading Spring Dial	
iv. Photo Tachometers	
v. Stroboscopic Counters	

B.	Five Types Of Pressure Instruments	
i.	Inclined Liquid Manometer	
ii.	Vertical Liquid Manometer	
iii.	Magnehelic Pressure Gauges	
iv.	Micrometer Liquid Hook Gauge	
v.	Piton Gauge	
2.	Air Velocity Instruments .....	2
A.	Outlet Velocity Reading Instruments	
B.	Function Of An Anemometer And A Velometer	
C.	Function Of Flow Hood	
D.	Electrical Anemometers	
3.	Temperature, Humidity And Hydronic Instruments .....	5
A.	Thermometers	
i.	Glass Stem	
ii.	Metal Dial	
iii.	Pyrometer	
iv.	Multipoint Reading	
v.	Recording	
B.	Thermometer Use	
C.	Psychrometers	
i.	Sling	
ii.	Powered	
D.	Psychometric Charts	
E.	Flow Measurements For Hydronic Systems	
F.	Four Types Of Flow Meters	
i.	Orifice Plate	
ii.	Venturi	
iii.	Circuit Testers	
iv.	Pitot Tube	
4.	Air & Hydronic Text Reports .....	5
A.	Air Balance Test Reports	
B.	Air Balance Worksheets	
C.	Outlet Balance Report	
D.	Rectangular And Round Pitot Tube Traverse Sheets	
E.	Hydronic Balance Test Reports	
F.	Flow Diagrams	
G.	Pump Test Reports	
H.	Low, Medium And High Pressure Systems	
i.	3 Types Of Low Pressure Supply Systems	
ii.	2 Types Of Low Pressure Exhaust Systems	
iii.	3 Types Of Conventional High Pressure Systems	

5. Balancing Low Pressure Constant Volume Supply Systems .....	3
A. Testing And Balancing Procedures	
B. Troubleshooting Procedures	
C. Air Movement And Resistance In HVAC Systems	
6. Balancing Return Air & Toilet Exhaust Systems .....	3
A. Return Systems	
B. Balancing Return Systems With Separate Systems	
C. Return Air Plenum Ceiling Systems	
D. Toilet Exhaust Systems	
E. Constant Volume Systems	
i. Medium Pressure	
ii. High Pressure	
F. High Pressure Dual Duct	
G. High Pressure Induction System	
7. Variable Air Volume (VAV) Systems .....	6
A. Operating VAV Systems	
B. Flow Requirements For VAV Systems	
C. Diversity Factor	
D. True VAV Vs. Secondary VAV System	
E. High, Medium And Low Pressure Systems	
F. Eleven Components Of A VAV System	
8. Ductwork And Damper Testing .....	2
A. Duct Leakage	
B. Maximum Allowable Duct Leakage	
C. Leak Testing Duct Work	
D. Troubleshooting	
E. Setting Outside And Return Air Dampers	
9. Balancing Exhaust And Residential Systems .....	3
A. Three Categories Of Components	
i. Particulates	
ii. Gases	
iii. Fumes	
B. Static Pressure	
C. Four Types Of Collectors	
i. Centrifugal Cyclone	
ii. Baghouse	
iii. Packed Tower Wet Scrubber	
iv. Electrostatic Precipitator	
D. Reading Air Flow	
E. General Balancing Procedures	

10. Fan Design & Operation .....	2
A. Design And Operation Of Fans	
i. Tubular Inline	
ii. Van Axial	
iii. Roof Exhaust	
B. Fan CFM And System Static Pressure Relationship	
C. Fan Performance	
D. Troubleshooting Fan Problems	
11. Drives/Grilles, Diffusers And Ak Areas .....	3
A. Fan Drive Components	
B. Types Of Fan Sheaves	
i. Fixed	
ii. Variable Pitch	
iii. Automatic Variable Pitch	
C. Selection Of V-Belts For HVAC Systems	
D. Ak Area	

**SECOND HALF**  
**(72 hours)**

**IAQ Training ..... 36**

- 1. Definition And Types Of IAQ Problems ..... 2
  - A. Types Of PM Preventive Maintenance Programs
  - B. Scheduled Vs. Unscheduled Maintenance
  - C. Automated And Manual PM Systems
  - D. Facility Preventive Maintenance Survey
  
- 2. Developing A Preventive Maintenance Program ..... 3
  - A. Equipment History Record File
  - B. PM Record Program
  - C. PM Charts
  - D. PM Work Orders
  - E. Master Schedule
  
- 3. Operating A PM System – HVAC Design & Operation ..... 2
  - A. Information Processing System
  - B. Repair Work Order
  - C. Impact Of Facility Cost Controls
  - D. General Operation Of HVAC System
  - E. Understanding The Facility-Specific Design Of HVAC System
  
- 4. HVAC General System Maintenance ..... 2
  - A. Occupant Comfort And Health
    - i. Temperature
    - ii. Relative Humidity
    - iii. Cleanliness
    - iv. Filters
  - B. Operation And Maintenance
    - i. Mechanical Filters
    - ii. Electronic Filters
  - C. Air Circulation And Flow Problems
  - D. System Start-Up And Purging
  - E. Positive Pressure Systems
  - F. Common Causes Of Odors
  
- 5. HVAC Air Handling Systems ..... 3
  - A. Common HVAC Air Handling Systems
  - B. Energy Consumption
  - C. System Operation
    - i. Economizer
    - ii. Single Zone
    - iii. Multi-Zone
    - iv. Dual Duct
    - v. Reheat

6. HVAC Types .....	2
A. Variable Air Volume	
B. All Water System	
C. Air And Water System	
7. Chemical Inventory, Storage, Handling And Safety .....	2
A. Chemical Management	
B. Chemical Inventory	
C. Storage And Handling	
D. Accidents	
E. Use And Storage Of Pesticides	
F. Proper Housekeeping	
8. Construction, Repair And Renovation .....	2
A. Safe Practices	
B. Migrating Sink Effect	
C. Chemical Emissions	
D. MSDS Sheets	
E. MSDS File System	
9. Prevention Strategies Beyond The PM Program .....	2
A. Visual Inspections	
B. Structural Problems	
C. HVAC Checklists	
D. Pollutant, Source And Pathway Survey	
E. Random Air Sampling	
F. IAQ Recordkeeping System	
10. Troubleshooting IAQ Complaints .....	2
A. Resolving IAQ Complaints	
B. Determining When Complaints Are Resolved	
11. Working Conditions And IAQ Illnesses .....	2
A. Air Quality Factors	
B. Video Display Terminals	
C. Indoor Lighting	
D. Noise In The Workplace	
E. Building Related Illness	
F. Sick Building Syndrome	
G. Multiple Chemical Sensitivity	
H. Psychogenic Illness	
12. Major Indoor Contaminants: Their Sources And Control .....	2
A. IAQ Contaminants	
i. Particles	
ii. Gasses	
iii. Vapors	
iv. Mixtures	
B. IAQ Control	
C. Typical Sources	
i. Asbestos	

ii. Lead	
iii. Biological Contaminants	
13. Contaminated Gasses And Mixtures .....	2
A. Contaminants	
i. Carbon Dioxide	
ii. Carbon Monoxide	
iii. Nitrogen Dioxide	
iv. Formaldehyde	
v. Ozone	
vi. VOC's	
vii. Soil Contaminants	
B. Sources	
i. Environmental Tobacco Smoke	
ii. Wood Smoke	
iii. Perfumes, Deodorants And Cosmetics	
iv. Pesticides	
C. Specialized Use Areas	
14. Contaminated Outdoor Air And Microbial Contaminants .....	2
A. Cleaning Outdoor Air For Use Indoors	
B. Air Filtration	
C. HEPA Filters	
D. Absorption Filters	
E. Microbial Contaminants	
F. Air Sampling For Microbials	
15. Air Sampling And Carbon Dioxide .....	2
A. Accuracy	
B. Basic Measurement And Parameters	
C. Equipment For Measuring Temperature And Humidity	
D. Acceptable Ranges	
E. Equipment Used For Measuring Carbon Dioxide	
16. Air Volume And Air Circulation .....	2
A. Equipment For Readings	
B. Measuring Air Circulation	
C. Measuring And Calculating Outdoor Air Percentage	
17. Carbon Monoxide, Formaldehyde, Radon, Asbestos & Lead .....	2
A. Carbon Dioxide Readings	
B. Formaldehyde Readings	
C. Radon Readings	
D. Asbestos And Lead Detection	

<b>Review Topics .....</b>	<b>36</b>
1. Mathematics .....	6
2. Pumps .....	6
3. CPR And First Aid .....	10
4. Auxiliary Steam Plant Equipment .....	10
5. General Review .....	4

The CPR and First Aid will be given certified personnel such as the local Fire Department.

Total Course time will be 144 hours per year

WORK PROCESS SCHEDULE  
 STATIONARY ENGINEER  
 O\*NET-SOC CODE: 51-8021.02 RAPIDS CODE: 0536

1.	Electrical control and distribution	800
2.	Refrigeration systems	1000
	Commercial	
	Industrial	
3.	Air conditioning systems	1000
	Repair/maintenance operation	
	CFC Training & Certification	
4.	Boilers	1000
	Low pressure systems	
	High pressure systems	
	Repair/maintenance operation	
5.	Industrial equipment	800
	Utilization	
	Maintenance/repair	
6.	Chemical treatment of water systems	800
7.	Fuels and fuel technology	600
	Total hours	6000

Hours worked by the apprentice over and above the required minimum of 6000 hours shall be distributed over this schedule in the same ratio allotted each subject area in the preceding breakdown.

Total Hours.....6000

These schedules are to be considered flexible and may be revised by the JAC to accommodate any condition and may, with the approval of the JAC, be applied interchangeably among the different apprentice classifications.

RELATED INSTRUCTION OUTLINE  
STATIONARY ENGINEER  
O\*NET-SOC CODE: 51-8021.02 RAPIDS CODE: 0536

**FIRST-YEAR**

**FIRST HALF**

1. *Basic Mathematics*

- A. Whole numbers
  - a. Number line
  - b. Real numbers
  - c. Basic arithmetic functions
  - d. Absolute numbers
- B. Common Fractions
  - a. Simple fractions
  - b. Conversion to decimal
  - c. Proper & improper fractions
  - d. Mixed numbers
  - e. Complex fractions
  - f. Arithmetic functions with fractions
    - i. Addition & subtraction  
Common divisor
    - ii. Multiplication & division  
Lowest common denominator
    - iii. Proportions and percentages
      - a. Discount
      - b. Commission
      - c. Interest
      - d. Profit & loss

2. *Introduction to Boilers*

- A. Boiler Definition
- B. Basic Terms  
BTU, Radiation, Conduction & Convection
- C. Classifications
  - a. Water tube
  - b. Fire tube
- D. Accessories
  - a. Superheaters
  - b. Steam Separators
  - c. Heat Recovery
    - i. Preheater
    - ii. Economizers
  - d. Basic Safety  
Devices, LWCO, Safety valves, etc.
  - e. Basic Operation
    - i. Firing
    - ii. Water cycle
    - iii. Fuel cycle

- E. Basic Construction
  - a. Container Construction
  - b. Furnace Construction
- F. Industrial & Utility Boilers
  - a. Design
  - b. Operation
- 3. *Algebra & Geometry*
  - A. Roots & squares
  - B. Powers
  - C. Algebraic Expressions
  - D. Equations using algebra
    - a. Addition & subtraction
    - b. Multiplication & division
  - E. Geometry
    - a. Squares
    - b. Rectangles
    - c. Circles
    - d. Angles & triangles
    - e. Formulas for area, circumference, etc.
    - f. Interpolation
- 4. *Boiler Accessories*
  - A. Water Column
    - a. Gauge glass
    - b. Try cocks
  - B. Fusible Plugs
    - a. Fireside
    - b. Waterside
  - C. Steam Gauges
    - a. Siphon
    - b. Bourdon Tube
  - D. Feedwater Regulators
    - a. Float
    - b. Thermohydraulic
    - c. Thermostatic Expansion
  - E. Safety Valves
    - a. Code (ASME)
    - b. Testing
    - c. Construction
    - d. Operation
  - F. Blowdown Apparatus
    - a. Surface blowdown
    - b. Bottom blowdown
    - c. Flash tank
  - G. Non-return Valves
    - Operation
  - H. Steam Headers
    - a. Construction
    - b. Purpose
  - I. Soot Blowers
    - a. Operation

- b. Design
  - J. Valves
    - a. Globe
    - b. Gate
    - c. Balanced valve
    - d. Check valves
    - e. Reducing
    - f. Stop cocks
  - K. Instruments and Automatic Combustion Control
    - a. Draft gauge
    - b. Pressure gauges
    - c. Temperature indicators
    - d. Automatic controls
      - i. On-off
      - ii. Postponing
      - iii. Metering
- 5. *Boiler Design and Construction*
  - A. Materials
  - B. Stresses
    - a. Tubes
    - b. Shell
    - c. Drums
  - C. Drum & shell construction
  - D. Rivets and riveted joints
  - E. Welded construction
  - F. Stays
    - Types
  - G. Fittings
  - H. Assembly
  - I. Heating Surface
    - a. Tubes
    - b. Shells
    - c. Tube sheets
  - J. Steaming Capacity

## SECOND HALF

- 6. *Combustion of Fuel*
  - A. Requirements
  - B. Theory
    - a. Absolute pressure
    - b. Constant temperature
    - c. Constant volume
    - d. Constant pressure
    - e. Atoms & molecules
    - f. Combustion
      - i. Carbon
      - ii. Hydrogen
      - iii. Sulfur
    - g. Perfect combustion

- h. Complete combustion
    - i. Incomplete combustion
    - j. Excess air
  - C. Air Supply
    - Draft
      - i. Draft gauge
      - ii. Forced
      - iii. Induced
      - iv. Balanced
      - v. Induced draft fans versus chimneys
  - D. Coal
    - a. Origination
    - b. Composition
      - Proximate analysis
    - c. Heating value
    - d. Ultimate analysis
    - e. Coking
    - f. Soft coal
    - g. Hard coal
    - h. Moisture
    - i. Other characteristics
  - E. Fuel Oil
    - a. Origination
    - b. Characteristics
    - c. Specific gravity
      - API scale
    - d. Viscosity
    - e. Heating values
    - f. Types
      - Classes or comm. Etc.
    - g. Combustion
  - F. Gas
    - a. Origination
    - b. Characteristics
    - c. Make-up
    - d. Heating values
    - e. Types
- 7. *Operation and Maintenance of Steam Boilers*
  - A. Placing Boilers in Service
    - a. Hydrostatic Test
    - b. Boil out
  - B. Normal Operation
    - a. Automatic control
    - b. Manual control
    - c. Feed water regulators
    - d. Scale
    - e. Corrosion
    - f. Carry over
    - g. Foaming
    - h. Priming
    - i. Caustic embrittlement

- j. Water treatment
        - i. External
          - a. Zeolite softener
          - b. Demineralizer
          - c. Hot process lime-soda-ash
          - d. Evaporator
        - ii. Internal
          - a. Chemicals
          - b. Feed water heaters
          - c. Blowdown
      - k. Boiler & fuel efficiencies
        - i. Formulas
        - ii. Losses
    - C. Emergencies
      - Procedures
    - D. Banking
    - E. Maintenance
      - a. Fireside
      - b. Waterside
    - F. Inspections
      - Preparation
    - G. Repairs
      - a. Tubes
      - b. Drums
      - c. Baffles
      - d. Refractory walls
  - 8. *Safety and First aid*
    - A. Precautions
    - B. Common sense
      - a. Storage of chemicals
      - b. Storage of fuel
    - C. Fire protection
      - a. Extinguisher
      - b. Boiler safety
    - D. Personal Safety
      - a. First aid
      - b. CPR
  - 9. *Labor Movement*
    - A. History
      - a. AFL-CIO
      - b. Operating Engineers
    - B. Current Status
    - C. Future Growth
  - 10. *Review*

**SECOND-YEAR  
FIRST HALF**

- 1. *Fundamentals of Air Conditioning*
  - A. Temperature and heat

- B. Measurements
- C. Basic Physics
  - a. States of matter
  - b. Pressure
  - c. Forces
  - d. Energy
  - e. B.T.U., Therm, calorie
  - f. Sensible, specific, latent heat
  - g. Heat transfer
  - h. Enthalpy
  - i. Boyles law
  - j. Charles law
- 2. *Components*
  - A. Basic cycle design and operation
  - B. Components
    - a. Evaporator
    - b. Compressor
    - c. Condensers
      - i. Air cooled
      - ii. Water cooled
      - iii. Evaporative condensing
    - d. Receiver
    - e. Metering devices
- 3. *Refrigerants*
  - A. Types
  - B. Handling
  - C. Safety
- 4. *Design and Construction*
  - A. Evaporators
  - B. Compressors
    - a. Types
    - b. Capacity control
    - c. Lubrication
  - C. Condensers
    - a. Types
    - b. Cooling towers
    - c. Evaporative condensing
  - D. Receiver
  - E. Metering devices
    - Types

## SECOND HALF

- 5. *Accessories*
  - A. Accumulator
  - B. Filter devices
  - C. Service valves
  - D. Oil separator
- 6. *Controls*
  - A. Motors controls

- B. Safeties
  - a. Low temperature
  - b. Low pressure
  - c. High pressure
  - d. Rupture disk
- 7. *Physics of Air Conditioning*
  - A. Enthalpy chart
  - B. Psychrometric chart
- 8. *Refrigerant System Operations*
  - A. Comparison to reciprocating
  - B. Superheat
  - C. Oil traps
- 9. *Centrifugal Refrigeration*
  - A. Comparison to reciprocating
  - B. Designs
  - C. Operations
  - D. Parts
- 10. *Absorption Refrigeration*
  - A. Comparison to mechanically operated
  - B. Design
  - C. Basic operation
  - D. Parts
- 11. *Heat Pumps*
  - A. Basic cycle
  - B. Design
  - C. Basic operation
  - D. Parts
- 12. *Basic Control Electricity*
  - A. Wiring of controls
  - B. Schematics
- 13. *Safety*
  - A. Personal
  - B. Equipment

**THIRD-YEAR  
FIRST HALF**

- 1. *Basic Electricity*
  - Fundamentals
    - a. Safety
    - b. Circuits, electrons, batteries, symbols, atoms
- 2. *Sources of Electricity*
  - A. Chemical
  - B. Light
  - C. Pressure
  - D. Heat
  - E. Magnetism
    - a. Generators, alternators
    - b. Principles of magnetism
- 3. *Conductors and insulators*

- A. Wires, fuses, circuit breakers
- B. Insulators
- 4. *Ohm's Law*
  - A. Electromotive force
  - B. Current
  - C. Resistance
  - D. Watt, kilowatt, kwh
- 5. *Series alternating current and direct current circuits*
  - A. Calculation of current and direct current circuits
  - B. Ohm's Law
- 6. *Parallel alternating current and direct current circuits*
  - Calculation of current and voltage drops
    - a. Thevenih's equivalent theorem
    - b. Voltage divider theorem
- 7. *Series and parallel circuits*
  - Calculations
- 8. *Resistors and capacitors*
  - Resistors
    - a. Symbols, construction
    - b. Thermistors

## SECOND HALF

- 9. *Meters*
  - A. Types
  - B. Uses
  - C. Reading meters
- 10. *Alternating current voltages*
  - A. Sine wave
  - B. How alternating current is produced
  - C. Sine wave cycle
  - D. Frequency, period, amplitude
  - E. Peak voltage
  - F. Rms
  - G. Current - voltage phase relationship
    - Power factor
- 11. *Electromagnetic induction*
  - A. EMF in a conductor
  - B. Induced EMF
  - C. Inductance
  - D. Transformers
    - a. Construction
    - b. Uses
- 12. *Motors and motor circuits*
  - A. Alternating current
    - a. Overview
    - b. Characteristics
    - c. Advantages and disadvantages
  - B. Direct current
    - a. Overview
    - b. Characteristics

- c. Advantages and disadvantages
- 13. *Delta and wye wind configurations for motor and generating systems*
  - Delta to wye conversions
    - a. Mathematical analysis
    - b. Number of poles
- 14. *Safety*
  - A. Precautions
  - B. Fire Protection
    - Extinguisher
  - C. Personal Safety

## **APPENDIX B**

# **AER SPONSOR MANUAL ETA-671 APPRENTICESHIP AGREEMENT**

**Appendix C**

**(SAMPLE)  
AFFIRMATIVE ACTION PLAN**

**ADOPTED BY**

***(INSERT NAME OF JAC)***

**AS REQUIRED UNDER TITLE 29, CODE OF FEDERAL REGULATIONS, PART 30  
AMENDED MAY 12, 1978**

**DEVELOPED IN COOPERATION WITH THE  
U.S. DEPARTMENT OF LABOR  
OFFICE OF APPRENTICESHIP**

**APPROVED BY \_\_\_\_\_  
REGISTRATION AGENCY**

**DATE APPROVED: \_\_\_\_\_**

## **SECTION I - INTRODUCTION**

The local JAC enters this Affirmative Action Plan (AAP) with good faith for the purpose of promoting equality of opportunity into its registered apprenticeship program. The local JAC seeks to increase the recruitment of qualified women and/or minorities for possible selection into the apprenticeship program in the event women and/or minorities are underutilized in the apprenticeship program. The local JAC hereby adopts the following nondiscriminatory pledge and the AAP.

This AAP is a supplement to the Apprenticeship Standards. Any changes made by the local JAC will become part of this written AAP, once approved by the Registration Agency.

## **SECTION II - EQUAL OPPORTUNITY PLEDGE**

The local JAC commits to the following Equal Opportunity Pledge:

"The recruitment, selection, employment, and training of apprentices during their apprenticeship, shall be without discrimination because of race, color, religion, national origin, or sex. The JAC will take affirmative action to provide equal opportunity in apprenticeship and will operate the apprenticeship program as required under Title 29 of the Code of Federal Regulations, part 30."

## **SECTION III - UTILIZATION AND ANALYSIS, GOALS AND TIMETABLES**

In order to allow positive recruitment and full utilization of minorities and women in the apprenticeship program, the local JAC pledges to identify outreach efforts under Section IV which will be undertaken. The purpose of the analysis is to determine the minority and women's labor force in the local JAC's labor market area. Once the labor force is determined, the local JAC can determine if deficiencies exist in terms of underutilization of minorities and/or women in the occupations registered with the Registration Agency. (See attached Affirmative Action Plan Workforce Analysis Worksheet)

## **SECTION IV - OUTREACH AND POSITIVE RECRUITMENT**

The local JAC's AAP includes the following "checked" outreach and positive recruitment efforts that would reasonably be expected to increase minority and women's participation in apprenticeship by expanding the opportunity of minorities and women to become eligible for apprenticeship selection. **Once those efforts have been checked, the local JAC will set forth the specific steps they intend to take under each identified effort.** The local JAC will identify **a significant number of activities** in order to enable it to meet its obligation under Title 29, CFR, part 30.4(c).

A. An announcement of specific apprenticeship openings must be disseminated thirty (30) days in advance of the earliest date for application at each interval to the following agencies/organizations:

- Registration Agency
- Women's Organizations/Centers
- Local Schools
- Employment Service Centers
- One Stop Centers
- Vocational Education Schools
- Other Organizations/Centers (which can effectively reach minorities and women)
- Newspapers (which are circulated in the minority community and among women)

The announcement will include the nature of the apprenticeship, requirements for admission to apprenticeship, availability of apprenticeship opportunities, sources of apprenticeship applications, and the local JAC's equal opportunity policy. The period for accepting applications as established by the local JAC is:

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- B. Participation in annual workshops conducted by employment service agencies for the purpose of familiarizing school, employment service and other appropriate personnel with the apprenticeship program and current opportunities.
- C. Cooperation with school boards and vocational educational systems to develop programs for preparing students to meet the standards and criteria required to qualify for entry into the apprenticeship program.
- D. Internal communication of the local JAC's equal opportunity policy should be conducted in such a manner to foster understanding, acceptance, and support among the local JAC's various officers, supervisors, employees, and members, and to encourage such persons to take the necessary action to aid in meeting its obligation under Title 29, CFR, part 30.
- E. Engaging in programs such as outreach for the positive recruitment and preparation of potential applicants for apprenticeships; where appropriate and feasible, such programs will provide for pre-testing experience and training. In initiating and conducting these programs, the local JAC may be required to work with other sponsors and appropriate community organizations. The local JAC will also initiate programs to prepare women and encourage women to enter traditionally male programs.

- F. Encouraging the establishment and utilization of programs of pre-apprenticeship, preparatory trade training, or others designed to afford related work experience or prepare candidates for apprenticeship. The local JAC will make appropriate provisions in its affirmative action plan to assure that those who complete such programs are afforded full and equal opportunity for admission into the apprenticeship program.
- G. Utilizing journeyworkers to assist in the implementation of affirmative action in the apprenticeship program.
- H. Granting advance standing or credit on the basis of previously acquired experience, training, skills, or aptitude for all applicants equally.
- I. Other appropriate action to ensure that the recruitment, selection, employment, and training of apprentices during their apprenticeship will be without discrimination because of race, color, religion, national origin, or sex (e.g., general publication of apprenticeship opportunities and advantages in advertisements, industry reports, articles, etc., use of present minority and female apprentices and journeyworkers as recruiters; career counseling; development of reasonable procedures to ensure employment opportunity, including reporting systems, on-site reviews, briefing sessions).

**(Identify Action:)**

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**FOR EACH ITEM CHECKED IN SECTION IV, LIST EACH SPECIFIC STEP THAT THE JAC WILL UNDERTAKE TO FULFILL THAT OUTREACH AND RECRUITMENT STEP**

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**SECTION V - ANNUAL REVIEW OF AFFIRMATIVE ACTION PLAN**

The local JAC will make an annual review of its current AAP and its overall effectiveness and institute any revisions or modifications warranted. The review will analyze (independently and collectively) the affirmative action steps taken by the local JAC for evaluating the positive impact, as well as the adverse impact in the areas of outreach and recruitment, selection, employment, and training. They will work diligently to identify the cause and effects that result from their affirmative action measures. The local JAC will continually monitor these processes in order to identify the need for a new affirmative action effort and/or deletion of ineffective existing activity(ies). All changes to the AAP must be submitted to the Registration Agency for approval. The local JAC will continually monitor the participation rates of minorities and women in the apprenticeship program in an effort to identify any type of underutilization. If underutilization exists, corrective action will be immediately implemented. The goals and timetables also will be reviewed periodically as determined by the Registration Agency and updated where necessary.

**SECTION VI - OFFICIAL ADOPTION**

The *(Insert Name of Local JAC)* hereby officially adopts this Affirmative Action Plan on this \_\_\_\_\_ day of \_\_\_\_\_, (INSERT YEAR).

\_\_\_\_\_  
**SIGNATURE OF (MANAGEMENT PROVIDE TITLE)**

\_\_\_\_\_  
**PRINTED NAME**

\_\_\_\_\_  
**SIGNATURE OF (LABOR TO PROVIDE TITLE)**

\_\_\_\_\_  
**PRINTED NAME**

*Sponsor(s) may designate the appropriate person(s) to sign the Standards on their behalf.*

## AFFIRMATIVE ACTION PLAN WORKFORCE ANALYSIS WORKSHEET

### A. SPONSOR INFORMATION

Program Number:			
Name of Sponsor:			
Address:			
City/State/Zip Code:			
Contact Person:			
Phone Number:		FAX Number:	
E-Mail Address:			

### B. OCCUPATIONAL INFORMATION

Occupational Title: *			
RAPIDS Code:		O*NET/SOC Code:	
Type of selection method used:			
Labor Market Area description:			

### C. LABOR MARKET AREA & OCCUPATIONAL PARTICIPATION DATA

<b>C.1 Total Labor Force in Labor Market Area *</b>		
Number of Women:		% of labor force
Number of Minorities:		% of labor force
<b>C.2 Working Age Population in Labor Market Area *</b>		
Number of Women:		% of labor force
Number of Minorities:		% of labor force
<b>C.3 Apprentice Participation in Craft/Occupation in National Apprenticeship System **</b>		
Number of Women:		% of apprentices
Number of Minorities:		% of apprentices
<b>C.4 The General Availability of Minorities and Women with the Present or Potential Capacity for Apprenticeship in Program Sponsor's Labor Market Area. ***</b>		
Number of Women:		
Number of Minorities:		

Resources for obtaining labor market information.

\* [http://www.census.gov/hhes/www/eeoindex/page\\_c.html](http://www.census.gov/hhes/www/eeoindex/page_c.html)

\*\* RAPIDS Data available from Registration Agency.

\*\*\* Program Sponsors may use any reasonable method for determining the general availability of minorities and women with the present or potential capacity for apprenticeship, including relying on the data recorded in Section C.1 for "Total Labor Force", C.2 for "Working Age Population", and C.3 "Apprentice Participation in Particular Craft/Occupation" to propose the entries for "The General Availability of Minorities and Women."

**D. SPONSOR'S WORKFORCE DATA**

D.1 Total Number of Journey/Craft Workers Employed:		
Number of Women:		% of work force
Number of Minorities:		% of work force
D.2 Total Percentage of Apprentices or of Applicant Pool (depending on selection method used)		
Numerical percentage of Women apprentices or women in applicant pool:		%
Numerical percentage of Minority apprentices or minorities in applicant pool:		%

**E. ADDITIONAL RESOURCE DATA FOR CONSIDERATION IN ESTABLISHING GOALS**

Industry Source Data	Minority rate of participation	Female rate of participation
E.1 Registered Apprenticeship Partners Information Data System (RAPIDS): *		
E.2 EEOC Occupational Employment Data: **		

\* Data available from Registration Agency

\*\* <http://www.eeoc.gov/stats/jobpat/jobpat.html>

**F. DETERMINATION OF UTILIZATION**

Analysis	Yes	No
Minority Underutilization:		
Female Underutilization:		

**G. SPONSOR'S GOALS:**

The program sponsor proposes and agrees to make a good faith effort to attain the goal of selecting \_\_\_\_\_ % minorities and \_\_\_\_\_ % women during the next EEO Review cycle. These goals will not be used to discriminate against any qualified applicant on the basis of race, color, religion, national origin or sex.

The number of new apprentices to be hired during the next year (or selection period) is estimated to be: \_\_\_\_\_

**H. REGISTRATION AGENCY APPROVAL:**

Sponsor	Registration Agency
_____ Sponsor's Signature	_____ Registration Agency Signature
_____ Typed Name	_____ Typed Name
_____ Title	_____ Title
_____ Date Signed	_____ Date Signed

## **Instructions for preparing and completing this worksheet**

The purpose of this workforce analysis worksheet is to establish a benchmark against which the demographic composition of the sponsor's apprenticeship program can be compared. The sponsor must separately determine the availability of minorities and women for each occupational title represented by the program. In determining availability, the sponsor must consider, at the very least, the factors identified at 29 CFR 30.4(e) in order to determine whether barriers to equal employment opportunity may exist with a particular occupational title.

Part A The Program Sponsor information section may be prepared by the sponsor representative or servicing Registration Agency Representative.

Part B Occupational information will be taken from the registered program standards, and may be prepared by the sponsor representative or servicing Registration Agency Representative. A Workforce Analysis Worksheet must be completed for each occupational title identified.

Part C Sponsors must use the most current and discrete statistical data available in determining availability estimates for the labor market area specified by the sponsor in Part B. Census data is one example of an appropriate source of statistical information. Other sources include data from local job service offices and data from colleges or other training institutions. Where possible, the Registration Agency has provided examples of appropriate sources of data.

For purposes of this section, the term "labor force" is defined to include both those individuals who are employed and those who are unemployed but looking for employment. The term "working age population" means persons ages 15 years and over whether or not they are currently in the labor force or looking for employment.

Part D The Program Sponsor must provide current workforce data as described in Part D. If the sponsor utilizes either Selection Method §30.5(b) (1) or (2), the data in D-2 will be reflective of the "pool" from which selections will be made. If the sponsor utilizes the Selection Method under §30.5(b) (3) or (4), the data in D-2 will be reflective of the current apprentices registered in the program.

Part E Additional Resource Data for consideration in establishing reasonable goals will be provided by the Registration Agency. This data will provide a snapshot of the national labor force for the given occupation title.

Part F Utilizing the data found in Parts C, D and E, the Program Sponsor is to determine if minorities and/or women are underutilized and must check the appropriate response.

Part G If the Program Sponsor's analysis determines that minorities and/or women are underutilized, the Sponsor, utilizing the resource data found in Parts C, D and E, will establish goals which are reasonable in consideration of the results which could be expected from its good faith efforts to make its overall affirmative action program successful. The Registration Agency will review and access the proposed goals and if found to be reasonable and attainable, will acknowledge receipt of the Sponsors goals for minorities and/or women.

Proposed goals for minorities and/or women that are lower than the current participation rate under the Program Sponsor will not be approved.

**Appendix D**

**(SAMPLE)  
QUALIFICATIONS AND SELECTION  
PROCEDURES**

**ADOPTED BY**

***(INSERT NAME OF LOCAL JAC)***

**DEVELOPED IN COOPERATION WITH THE  
U.S. DEPARTMENT OF LABOR  
OFFICE OF APPRENTICESHIP**

**APPROVED BY \_\_\_\_\_  
REGISTRATION AGENCY**

**DATE APPROVED: \_\_\_\_\_**

**The certification of this selection procedure is not a determination that, when implemented, it meets the requirements of the Uniform Guidelines on Employee Selection Procedures (41 CFR, part 60-3) or Title 29 CFR, part 30. Note that selection procedures may need to be modified to provide reasonable accommodations to qualified individuals with disabilities.**

## **SECTION I. - MINIMUM QUALIFICATIONS (EXAMPLES)**

Applicants will meet the following minimum qualifications:

A. Age

Apprentices must not be less than 18 years of age.

B. Education

High school diploma or GED is required to apply to the apprenticeship program; either one or the other is acceptable.

An applicant who is seventeen (17) years of age and is participating in a school-to-work program or equivalent and who otherwise meets all qualifications may be rated and ranked and placed on the list of eligible applicants. Such an applicant must be eighteen (18) years of age prior to being accepted into the apprenticeship program.

Applicants must submit a DD-214 to verify military training and/or experience if they are a veteran and wish to receive consideration for such training/experience.

C. Physical

Applicants will be physically capable of performing the essential functions of the apprenticeship program, with or without a reasonable accommodation, and without posing a direct threat to the health and safety of the individual or others.

Applicants will pass a physical agility test, fitness test, or screen for the current illegal use of drugs (**select all, some, or none, if applicable**) on acceptance into the program and prior to being employed.

E. Aptitude Test

Individual local JACs may elect to have an aptitude test as part of the selection procedure.

## **SECTION II. - APPLICATION PROCEDURES (SAMPLE LANGUAGE)**

- A. Applicants will be accepted (*throughout the year or as specified*). All persons requesting an application will have one made available upon signing the applicant log.
- B. All applications will be identical in form and requirements. The application form will be numbered in sequence corresponding with the number appearing on the applicant log so that all applications can be accounted for. Columns will be provided on the applicant log to show race/ethnic and sex identification and the progress by dates and final disposition of each application.
- C. Before completing the application, each applicant will be required to review the Apprenticeship Standards and will be provided information about the program. If the applicant has any additional questions on the qualifications or needs additional information to complete the application, it will be provided by the JAC.
- D. Receipt of the properly completed application form, along with required supporting documents (proof of age, driver's license, birth certificate or other acceptable documentation; copy of high school diploma, GED Certificate or other acceptable documentation) will constitute the completed application.
- E. Completed applications will be checked for minimum qualifications. Applicants deficient in one or more qualifications or requirements or making false statements on their application will be notified in writing of their disqualification. The applicant will also be notified of the appeal rights available to them. No further processing of the application will be taken.
- F. Applicants meeting the minimum qualifications and submitting the required documents will be notified where and when to appear for an interview (if applicable).

## **SECTION III. - SELECTION PROCEDURES (EXAMPLE)**

- A. The local JAC will schedule the interview and evaluation session. All applicants who have met the minimum qualifications and have submitted the required documents must be notified of the date, time, and place to appear.
- B. The interviewer(s) will rate each applicant during the interview on each of the factors on the applicant rating form taking into account the information

on the application and required documents, if applicable. The interviewer will record the questions asked and the general nature of the applicant's answers. The interviewer will then prepare a written summary of his or her judgment of the applicant derived from the interview.

- C. After completing the interview and evaluation of the applicants, the individual rating scores of the interviewer(s) will be added together and averaged to determine the applicant's final rating.
- D. Applicants will be placed on a Ranking List according to their scores at the evaluation session, with the applicant having the highest score being at the top of the list, and all applicants then listed in descending order based on score.
- E. As openings for the registration of new apprentices occur, the highest ranked applicant will be notified of selection by telephone. It will be the responsibility of the applicant to keep the local JAC informed of their current mailing address and telephone number.
- F. Selected applicants must respond to the notice of selection within 48 hours of notice. If applicants cannot be reached by telephone, their names will be passed and notice sent to their address by Certified Mail-Return Receipt Requested to determine if the applicants are still interested. If no response is received in fifteen (15) working days from the written notice, the applicant's name will be removed from the list. Only one certified notice will be mailed.
- G. Qualified applicants remaining on a preceding ranking list will automatically be carried forward on the new ranking list and slotted in wherever their rating score placed them for a period of two (2) years, unless the applicant has been removed from the list by their own written request or following failure to respond to an apprentice opening. Applicants who were not placed during the two (2)-year period that were on the ranking list, will be required to reapply.
- H. During the two (2)-year period, applicants who feel that their qualifications have improved since their original rating may submit documented evidence of such additional experience or training and request reevaluation and rating at the next regular processing cycle.

#### **SECTION IV. - DIRECT ENTRY**

JACs who wish to invoke the direct entry provision may do so without regard to the existing selection procedure or minimum qualifications used for entry into the apprenticeship program. Individuals selected into the apprenticeship program via

direct entry shall only include those individuals described below who have received training or employment in an occupation directly or indirectly related to the occupation(s) registered in these Standards. The JAC will award Credit for Previous Experience in accordance with Section XII of these Standards, and will insure apprentice(s) are paid at the wage rate commensurate with their skill attainment. The Credit for Previous Experience shall be awarded without regard to race, color, religion, national origin or sex. The methods for direct entry shall include the following:

- A. Youth who complete a Job Corps training program in any occupation covered in these Standards, who meet the minimum qualifications of the apprenticeship program, may be admitted directly into the program, or if no apprentice opening is available, the Job Corps graduate may be placed at the top of the current applicant ranking list and given first opportunity for placement. The JAC will evaluate the Job Corps training received for granting appropriate credit on the term of apprenticeship. Entry of Job Corps graduates will be done without regard to race, color, religion, national origin, or sex. **(Note: This is a method of direct entry into the apprenticeship program.)**
  
- B. Military Veterans who completed military technical training school and/or participated in a registered apprenticeship program or related craft while in the military in the occupations registered in the **(INSERT INDUSTRY)**, may be given direct entry into the apprenticeship program. The JAC shall evaluate the military training received for granting appropriate credit on the term of apprenticeship and the appropriate wage rate. The JAC will determine what training requirements they need to meet to ensure they receive all necessary training for completion of the apprenticeship program. Entry of Military Veterans shall be done without regard to race, color, religion, national origin, or sex. Military veterans who are registered with the Helmets to Hardhat program will be given the utmost consideration with regards to direct entry into the apprenticeship programs. **(Note: This is a method of direct entry into the apprenticeship program.)**
  
- C. An employee of a non-signatory employer not qualifying as a journeyworker when the employer becomes signatory, will be evaluated by the JAC in accordance with the procedures for the granting of credit for previous experience, and registered at the appropriate period of apprenticeship based on previous work experience and related training. Any employee not eligible for receipt of credit must make application in accordance with the normal application procedures. Entry into the program through this method shall be done without regard to race, color, religion, national origin, or sex. **(Note: This is a method of direct entry into the apprenticeship program.)**

- D. An individual who signs an authorization card during an organizing effort, wherein fifty-one percent (51%) or more of the employees have signed authorization cards, whether or not the employer becomes signatory, and is an employee of the non-signatory employer and does not qualify as a journeyworker, will be evaluated in accordance with the procedures for the granting of credit for previous experience and registered by the JAC at the appropriate period of apprenticeship based on previous work experience and related training. Any employee not eligible for receipt of credit must make application in accordance with the normal application procedures. Entry into the program through this method shall be done without regard to race, color, religion, national origin, or sex. **(Note: This is a method of direct entry into the apprenticeship program).** For such applicants to be considered they must:
1. be employed in the JAC's jurisdiction when the authorization card was signed;
  2. have been employed by the employer before the organizational effort commenced;
  3. have been offered the opportunity to sign authorization cards and be evaluated along with all other employees of the employer; and provide reliable documentation to the JAC to show they were an employee performing **(INSERT INDUSTRY)** work prior to signing the authorization card.
- E. An employee of a non-participating employer who becomes a new member employer of the sponsoring organization who does not qualify as a journeyworker when the employer becomes a member, will be evaluated by the Sponsor in accordance with the procedures for the granting of credit for previous experience, and registered at the appropriate period of apprenticeship based on previous work experience and related training. Any employee not eligible for receipt of credit must make application in accordance with the normal application procedures. **(Note: This is a method of direct entry into the apprenticeship program, whereby all minimum qualifications are waived.)**
- F. An individual who is or who has worked for a signatory or non-signatory employer and who, of his/her own choosing, solicits membership as a journeyworker and does not qualify as a journeyworker, will be evaluated in accordance with the procedures for the granting of credit for previous experience and registered by the JAC at the appropriate period of apprenticeship based on previous work experience and related training. Any employee not eligible for receipt of credit must make application in accordance with the normal application procedures. Entry into the program through this method shall be done without regard to race, color,

religion, national origin, or sex. ***(Note: This is a method of direct entry into the apprenticeship program).***

## **SECTION V. - COMPLAINT PROCEDURE**

- A. Any apprentice or applicant for apprenticeship who believes that he /she has been discriminated against on the basis of race, color, religion, national origin, or sex, with regard to apprenticeship or that the equal opportunity standards with respect to his/her selection have not been followed in the operation of an apprenticeship program, may personally or through an authorized representative, file a complaint with the Registration Agency or, at the apprentice or applicant's election, with the private review body established by the local JAC (if applicable).
- B. The complaint will be in writing and will be signed by the complainant. It must include the name, address, and telephone number of the person allegedly discriminated against, the local JAC involved, and a brief description of the circumstances of the failure to apply equal opportunity standards.
- C. The complaint must be filed not later than 180 days from the date of the alleged discrimination or specified failure to follow the equal opportunity standards, and, in the case of complaints filed directly with the review bodies designated by the local JAC to review such complaints, any referral of such complaint by the complainant to the Registration Agency must occur within the time limitation stated above or 30 days from the final decision of such review body, whichever is later. The time may be extended by the Registration Agency for good cause shown.
- D. Complaints of harassment in the apprenticeship program may be filed and processed under Title 29, CFR part 30, and the procedures as set forth above.
- E. The local JAC will provide written notice of their complaint procedure to all applicants for apprenticeship and all apprentices.

## **SECTION VI. - MAINTENANCE OF RECORDS**

The local JAC will keep adequate records including a summary of the qualifications of each applicant, the basis for evaluation and for selection or rejection of each applicant, the records pertaining to interviews of applicants, the original application for each applicant, information relative to the operation of the apprenticeship program, including, but not limited to, job assignment, promotion, demotion, layoff, or termination, rates of pay or other forms of compensation or

conditions of work, hours including hours of work and, separately, hours of training provided, and any other records pertinent to a determination of compliance with the regulations at 29 CFR part 30, as may be required by the U.S. Department of Labor. The records pertaining to individual applicants, selected or rejected, will be maintained in such manner as to permit the identification of minority and female (minority and non-minority) participants.

Each sponsor must retain a statement of its affirmative action plan for the prompt achievement of full and equal opportunity in apprenticeship, including all data and analysis made pursuant to the requirements of 29 CFR 30.4. Each sponsor also must maintain evidence that its qualification standards have been validated in accordance with the requirements set forth in 29 CFR 30.5(b).

In addition to the above requirements, adequate records will include a brief summary of each interview and the conclusions on each of the specific factors, e.g., motivation, ambition, and willingness to accept direction which are part of the total judgment. Records will be maintained for 5 years from the date of last action and made available upon request to the U.S. Department of Labor or other authorized representative.

**SECTION VI. - OFFICIAL ADOPTION OF SELECTION PROCEDURES**

The (INSERT NAME OF LOCAL JAC) hereby officially adopts these Selection Procedures on this \_\_\_\_\_ day of \_\_\_\_\_, (INSERT YEAR).

\_\_\_\_\_  
**SIGNATURE OF (MANAGEMENT TO PROVIDE TITLE)**

\_\_\_\_\_  
**PRINTED NAME**

\_\_\_\_\_  
**SIGNATURE OF (LABOR TO PROVIDE TITLE)**

\_\_\_\_\_  
**PRINTED NAME**

*Sponsor(s) may designate the appropriate person(s) to sign the Standards on their behalf.*