Pacific Gas and Electric Company

LETTER AGREEMENT NO. 06-55-PGE

IBEW

PACIFIC GAS AND ELECTRIC COMPANY
INDUSTRIAL RELATIONS DEPARTMENT
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INTERNATIONAL BROTHERHOOD OF
ELECTRICAL WORKERS, AFL-CIO
LOCAL UNION 1245, I.B.E.W.
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STEPHEN A. RAYBURN,
DIRECTOR AND CHIEF NEGOTIATOR

TOM DALZELL,
BUSINESS MANAGER

November 10, 2006

Mr. Tom Dalzell, Business Manager
Local Union No. 1245
International Brotherhood of
Electrical Workers, AFL-CIO
P.O. Box 2547
Vacaville, CA 95696

Dear Mr. Dalzell:

The Company and Union agreed to establish a joint committee to review and update the Steam and Nuclear Power Generation Apprentice Instrument Repairman Training Program. The committee has concluded the revision process and presented the attached updated program to the Joint Apprenticeship and Training Committee.

The JATC recommends and approves the attached revised program to replace the existing Apprentice Instrument Repairman Training Program.

If you are in accord with the foregoing and agree thereto, please so indicate in the space provided below and return one executed copy of this letter to the Company.

Very truly yours,

PACIFIC GAS & ELECTRIC COMPANY

By: _____
Stephen A. Rayburn
Director and Chief Negotiator

The Union is in accord with the foregoing and agrees thereto as of the date hereof.

LOCAL UNION NO. 1245, INTERNATIONAL
BROTHERHOOD OF ELECTRICAL WORKERS, AFL-CIO

16 March, 2007

By: _____
Tom Dalzell
Business Manager

References

1. Training Program for the Apprentice Instrument Repairman in Nuclear Power Plants, 3/1/89 Edition
2. TQ1.ID4, Non-Accredited training Records
3. I&C Initial Training Program of Instruction
4. M/M Initial Training Program of Instruction
5. EM Training Program of Instruction
6. Lab-Volt CBT Course 91001, DC Fundamentals
7. Lab-Volt CBT Course 91003, AC 1 Fundamentals
8. Lab-Volt CBT Course 91005, Semiconductor Fundamentals
9. Lab-Volt CBT Course 91006, Transistor Amplifier Circuits
10. Lab-Volt CBT Course 91007, Transistor Power Amplifiers
11. Lab-Volt CBT Course 91008, Transistor Feedback Circuits
12. Lab-Volt CBT Course 91009, Power Supply Regulators
13. Lab-Volt CBT Course 91010, FET Fundamentals
14. Lab-Volt CBT Course 910012, Operational Amplifier Fundamentals
15. Lab-Volt CBT Course 910014, Digital Logic Fundamentals
16. Lab-Volt CBT Course 910015, Digital Circuit Fundamentals 1
17. Lab-Volt CBT Course 910016, Digital Circuit Fundamentals 2
18. Lab-Volt CBT Course 91019, Transducer Fundamentals

Continued on next page

AUTHOR: STEVE HEINZE DATE: _____

REVIEWED BY: GUY VAUGHAN DATE: _____
TRAINING LEADER

REVIEWED BY: MARK TAYLOR DATE: _____
UNION COMMITTEE

REVIEWED BY: VINCE COSTANZA DATE: _____
POWER GENERATION TRAINING SPECIALIST

REVIEWED BY: BOB CHOATE DATE: _____
ASSISTANT BUSINESS MANAGER

APPROVED BY: _____ DATE: _____
JOINT APPRENTICESHIP AND TRAINING COMMITTEE

Remarks

1. Assumed entry level skills and knowledge – The Apprentice Instrument Repairman Training Program is an entry level program and assumes little or no maintenance experience from Apprentice candidates. Candidates will meet the following:
   - Applicable union bidding specifications as dictated by the Division Master Apprenticeship Agreement, and Physical Labor Agreement.
   - Satisfactory completion of the Arithmetic Computation Test (ACT) as dictated by the Division Master Apprenticeship Agreement.
   - Satisfactory completion of discipline Aptitude Test at the discretion of plant Supervision
   - Completion of one year as a Plant Utility Worker.
2. Evaluation of students will be conducted per TQ1.ID4. The frequency of evaluations will be the end of each course/lesson. Additionally the Apprentices will be evaluated every six month period per the Master Assignment Chart Review and Comments form.

End of Remarks

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SECTION I - Introduction

A. Introduction

Upon selection of the Instrument Repairman Apprenticeship the candidate has embarked in an occupation that might well become a life long vocation. The management of Pacific Gas and Electric is committed in its endeavor of guiding and assisting each Apprentice candidate through the Apprentice Training Program. The objective is your satisfactory completion of both the "On-the-Job" (OJT) training phase and the related "technical training" of your chosen craft. It is intended that each Apprentice become familiar with how the Apprentice Training Program is organized and how to optimize comprehension and retention of the learning material presented in each training phase.

The Apprentice program is comprised of 30 months of classroom, laboratory, and OJT. An additional 6 month period will be utilized for continued, additional or make-up qualification necessary to complete the program.

Each Apprentice will be exposed to challenges and opportunities, which, if accepted enthusiastically, will result in successful completion of the Apprentice Program and the attainment of Journeyman level status.

The rapid expansion of nuclear power generation and the increasing complexity of power plant equipment during the last few decades have necessitated the selection of personnel with specific qualifications and job potential. Through cooperative efforts, a great deal of select training material has been assembled. This material has been carefully chosen to give sound training in the discipline of I&C maintenance.

This training program will provide the Apprentice candidate with the means to associate theories with the practices of the Instrument Repairman craft. Once the training is mastered the candidate will be able to plan work and solve problems relating to his/her job. The academic portion of this training program is enhanced by progressive experiences of OJT. This is essential for the successful advancement to a higher level of skill.

There is no simple way to acquire the related information and skills of any trade. Considerable study and diligent work are required to master the extensive amount of technical knowledge and practical skills that is part of every modern craft. This apprentice-training program has been designed to make the acquisition of this knowledge in a logical manner. You will cover the material systematically with frequent checks on your progress and on the thoroughness of your learning. It is the Apprentice's responsibility to gain the maximum knowledge possible during the apprenticeship training.

B. Job progression and Bidding Procedure

Within your chosen field, normal lines of progression have been established and agreed to by both Company and Union. These lines of progression are shown in Exhibit VI B of the Company-Union Physical Labor Agreement. Your foreman can show them to you if you desire to review them. Generally the line of progression for the various maintenance classifications in ascending order is Utility Worker, Apprentice Instrument Repairman, Journeyman Instrument Repairman, Apprentice Control Technician and Control Technician.

The procedures related to the job bidding and promotions are beyond the scope of this section. They can be found in Title 205 of the Company-Union Physical Labor Agreement.

End of Section I

SECTION II – Program Overview

A. Academic Training

The academic phase of the Apprentice Training Program is designed to provide sufficient technical knowledge to solve problems encountered as a Journeyman. Academic instruction places emphasis on "theory", principals of operation, and construction. Academic instruction includes CBT lessons and works in conjunction with performance-based training such as OJT, laboratory, and CBT laboratory. Academic instruction is tested by quizzes, tests, and exams that become part of the apprentice's training record.

Tests and exams will be administered at the end of each lesson or course, respectively, in accordance with TQ2.ID4, Training Implementation.

B. On-The-Job Training

OJT training is performance-based training designed to provide instruction in job-related skills and knowledge in a work environment. The "OJT" phase of the Apprentice Training Program is designed to allow the Apprentice to work side-by-side with Journeyman level personnel to provide practical training with hands-on applications to prepare for Journeyman responsibilities. It is preferred that OJT be conducted by task qualified Journeyman level personnel. It is, however, recognized that in-plant OJT may not always be available or feasible. Therefore, portions of OJT may be conducted in a laboratory or simulator setting and by line and other than line personnel, providing they are task qualified in the task to be trained. The OJT hours shown in Section V.B., General Program Schedule, are adequate to complete the program in the allotted time.

Scheduling - OJT is divided into 10 categories (e.g., Control System Equipment, Test equipment, etc.) with minimum hourly OJT requirements given (see Section IV). The foreman is responsible for assigning the Apprentice to plant work. Utilizing the Master Assignment Chart (Attachment 6) and long-term training schedule, the foreman will be capable of resource loading the P-3 schedule for the required Apprentice OJT training hours when practical.

C. Program Management

It is the intent of the Apprentice Training Program and PG&E management that rather than completing this Apprentice program in its entirety and then entering into the Instrument Repairman Initial Training Program, the Apprentice candidate will complete selected portions of the Apprentice program and be allowed to enter into the applicable qualification portions of the Instrument Repairman Initial Training Program. It is intended that the apprentice finish the Apprentice Training Program with some or all of his/her fundamental and basic qualifications as listed in the Instrument Repairman Initial Training Program of Instruction. Supervision

of the Apprentice Training Program is the responsibility of the maintenance Foreman. The maintenance foreman is responsible for assigning the apprentice to plant work, review of training records, and remedial study plans. The foreman is assisted, as necessary, by other plant personnel such as Journeyman and training department instructors.

D. Progress Evaluation

Evaluation of successful progress through the Instrument Repairman Apprentice Program consists of two criteria. The first is academic achievement evaluated by tests and exams. The second is hourly recommended OJT as stated in Section IV of this document. Periodic tests and reviews will be held for the purpose of evaluating overall progress and determining success within the program. If academic progress becomes unsatisfactory, below the minimum level of 70%, the Foreman/instructor will review performance and recommend steps for remediation. It is recognized that it may not be possible to attain the scheduled OJT hours due to plant evolutions or training availability in a particular area. Should the Apprentice fail to complete the scheduled hours, they may be made up at a later date. Satisfactory completion of the Apprentice Program requires completing the total OJT hours as shown in Section V.B., General Program Schedule.

After a failure of a test or exam, line supervision will be notified, and the Apprentice shall be offered remediation and allowed to retake the test. Two additional tests shall be allowed at line supervision discretion. Academic failure will be addressed per SECTION F of the Company-Union Agreement, Master Apprenticeship Agreement.

The above shall also apply to hourly requirements of OJT given in conjunction with academic training. Records of progress will be kept and reviewed as part of the evaluation process.

If an Apprentice does not maintain an acceptable academic work and OJT level, notice shall be given to the Union's Business Representative or their designee. Progress to the next higher wage step, or demotion, shall be in accordance with Paragraphs F3, 4, 5, and 6 of the Master Apprenticeship Agreement. An Apprentice shall not be held back from the next higher wage step because the necessary academic training was not provided prior to one of these steps.

E. Apprentice Responsibility

It is the Apprentice's responsibility to maintain a grade average above the minimum level of 70%, satisfy the program OJT hourly requirement, and complete applicable TPEs to remain in the program. If the need for assistance arises, it is the Apprentice's responsibility to discuss these matters with plant supervision.

End of Section II

SECTION III – Guidelines

A. Goals of the Apprentice Instrument Repairman Program

The need for trained and fully qualified employees to accomplish their duties in a manner consistent with the Company's Standards of Construction, Safety, and Performance has resulted in this program, which coordinates OJT and related academic training.

The systematic acquisition of knowledge and skills offers the employee in training the vehicle to attain self-confidence, assuredness, satisfaction in his/her work, and to learn the correct and safe method of performing the Company's work.

B. Training

During the 36 months of the Apprenticeship, the Apprentice will be offered job training divided into six time periods that coincide with the wage steps of the classification. To ensure that uniform and safe practices will be followed during training, assignment of duties and work procedures shall be provided in each of the wage steps as outlined here and in Sections IV and V. The amounts of time or units of work as indicated in these sections are believed to be sufficient for the apprentice to develop proficiency. but should not be considered as inflexible, and could vary depending on the demonstrated ability of each individual Apprentice.

The program Map and General Program Schedule in Section V also specify those training periods in which the Apprentice shall receive related academic or classroom training.

The amount of OJT as specified in Section IV shall apply to the extent that such duties are performed by Journeymen where the Apprentice is headquartered. In the event a duty is not performed by the Journeymen at the Apprentice's headquarters, and is therefore not available in the training program, it shall be noted in the Apprentice's work record. Progression through the Apprenticeship, or to Journeyman, or to higher classification shall not be deterred for this reason. If such a duty later becomes applicable, the Apprentice (or Journeyman if classification has since changed) shall receive the training as may be required, to attain the expected journeyman proficiency. If, after a reasonable opportunity, proficiency is not attained, bids for progression to higher classification may be subject to the provisions of Section 205.11 of the Physical Labor Agreement.

C. General Guidelines

It is intended that assignment of the specified hours of OJT (Section IV) for each period of the apprenticeship will be made to the Apprentice as early in the period as is practical.

Hours shown in Section IV exclude any travel time needed to reach the place where training is to be given. However, such hours include time needed to prepare tools and equipment.

Except where otherwise specified, Apprentices shall be trained by assignment to work with qualified Journeymen. Progressive work experience in all phases of work should be provided throughout the first five periods of the Apprenticeship. Assignments during the last or sixth period will be made for the purpose of rounding out the Apprentice's experience.

Upon entering each new wage step and period of training, the work assignments in the period shall be such that the Apprentice will gain the basic knowledge and confidence on the equipment and the procedures being used. More complex assignments shall be made progressively as the Apprentice gains knowledge and capability.

As an Apprentice, work may be assigned without direct supervision only after instruction on the required duties and/or work procedures; after such work has been performed under direct supervision; and after the capability of performing such work safely has been demonstrated. At DCPP, only task-qualified personnel will perform work independently.

Except in emergency circumstances, an Apprentice shall not be temporarily assigned to the classification of Subforeman. If assigned to such classification, the Apprentice shall not be given the responsibility for duties beyond their current step of training.

At the end of the first six-months, and at the end of each succeeding six-month interval, progress will be examined to determine that the Standards of Achievement for current status in the program have been met and to determine whether the apprentice is qualified to advance to the next step in the program in accordance with Section VII – Progress Documentation Procedures and Attachment 6, Master Assignment Chart.

D. Guidelines for Training Periods

During the training periods, the Apprentice shall learn the use and care of tools and equipment and will gain knowledge of a Journeyman Instrument Repairman's work by participating in such work. The Apprentice will become familiar with the various Clearance Procedures, General Orders and Instructions applicable to the work that they perform.

The academics will be provided as outlined in Section IV and in accordance with the program map and schedule of Section V.

The OJT portion of the Apprentice Program has been planned, both in the subject material covered and the amount of training given, to provide the basic knowledge of the Instrument Repairman's duties. A Minimum number of training hours has been established for each phase of the OJT as shown on the Master Assignment Chart in Attachment 6.

End of Section III

SECTION IV - General Outline of Subject Matter

A. Academic Training

Academic training will consist of four courses. The instructional settings, facility, and duration for these courses are outlined in the paragraphs that follow. Course content is described in Section IV.C. Specific details, such as lesson titles, lesson numbers and JPMs are covered in Attachments 1 through 4.

Academic Course Content	Training Hours
Mathematics	40
I&C Basic Sciences	120
I&C Fundamentals	870
I&C Basic Technician Qualifications-	613
Total:	**1643**

B. On-The-Job Training

The OJT portion of this Apprentice Program has been carefully designed, both in the subject matter covered and the amount of time. For each phase of the OJT, a minimum number of training hours have been established and is shown on Attachment 6. The total hours are as follows:

Equipment	Training Hours
Control System Equipment	530
RCA Work Practices	180
Miscellaneous Equipment	540
Machine Shop Tools	30
Test Equipment	365
Controllers	150
Control Valves & Indicators	200
Supervisory Instruments	380
Recorders and Indicators	340
Electricity Experiments	160
Electronic Experiments	200
Boiler System Equipment*	(850)
Total:	**3075 / (3925)**

* - N/A DCPP

Each category is divided into individual items or components and the schedule (see Attachment 5 – Daily OJT Hours) specifies the training hours the Apprentice shall devote to complete the required level of training for each of the items.

Electricity and Electronic Experiments OJT is performed during the CBT phase and is not documented on Attachment 5.

Boiler System Equipment is N/A to DCPP and is annotated as such on Attachment 5. These hours apply to an IR who wishes to transfer to a fossil generating plant.

C. Program Overview

Mathematics:

Mathematics: provides instruction in numbers and fractions, equation solving, simplifying expressions, unit analysis, converting quantities, significant figures, powers of ten, exponential and logarithmic problem solving, square, cube and fractional exponent problem solving, trigonometric functions, graph plotting and information from strip, circular charts and nomograms.

I&C Basic Sciences:

Provides instruction in the following topics:

Physics: provides instruction in defining terms, energy conversion from one form to another, the six basic simple machines and Newton's laws of motion and gravity.

Electrical Science: provides instruction in structure of the atom, generating electricity, electrical properties of materials, definition of electrical terms, magnetism and electricity, the requirements for inducing a voltage, advantages and disadvantages of alternating current, and the basic elements of electrical safety.

Heat Transfer and Fluid Flow: provides instruction in identifying terms, heat cycle and plant components, modes of heat transfer, pressure, temperature and specific volume, effects of plant components on fluid parameters, causes and effects of water hammer, centrifugal and positive displacement pumps, and the causes and effects of cavitation.

Fundamentals of Hydraulics and Pneumatics: provides instruction in the transmitting force and energy, solids, liquids and gases, Pascal's Law, gauge pressure scales and applications, defining basic terms and concepts, how hydraulic energy is transmitted through a system, resistance and pressure in a hydraulic system, effects of heat, pressure differential, velocity and flow rate.

Basic Chemistry: provides instruction in definition of terms, the periodic table, atomic symbology, properties and states of matter, acids, bases and salts, the pH scale, corrosion and factors that promote corrosion, impurities in plant water systems, water chemistry control, controlling reactor coolant chemistry, effects that plant components and systems can have on secondary water chemistry, and types of sampling methods used at DCPP.

Basic Atomic and Nuclear Physics: provides instruction in structure and components of the atom, units for atomic structure and particle nomenclature, the radioactive decay process, nuclear interactions such as charged particles, photons and neutrons, the nuclear fission process, reactor reactivity control, and types of reactors used for power generation.

Properties of Nuclear Plant Materials: provides instruction in description of three basic metal crystal structures, simple stresses which may affect materials, basic properties of metals, metal failure mechanisms, properties of metals found in nuclear plant components, effects of corrosion on metals and corrosion controls, thermal stress, and radiation effects.

Reactor and Refueling Systems: provides instruction in reactor vessel & internals, core components, Spent Fuel Pool Cooling (SFP) system, and Fuel Handling system, importance to plant safety, interrelationships between them and other systems, Technical Specification LCOs and ECGs, purpose of Integral Fuel Burnable Absorbers, system flow paths, and fuel handling tools and components.

Primary Systems: provides instruction in Reactor Coolant System (RCS), Reactor Coolant Pump System (RCP), the Steam Generator system (SG), Containment Structure System, and Containment Spray System to include block diagrams, major components, functions and locations, process flow paths, importance to plant safety and/or radioactive containment and relationship with other plant components, and the physical connections between the RCS and containment.

Steam Systems: provides instruction in the Main Steam (MS) System, Moisture Separator Reheaters (MSRs), Main Turbine System, EH Oil Supply System to include block diagrams, major components, functions and locations, process flow paths, importance to plant safety and relationship with other plant systems. It also discusses Main Turbine – Generator LO System, turbine supervisory instrumentation, and Steam Dump System importance to radioactivity containment.

Feed Systems: provides instruction in the Condensate System, MFW System, Auxiliary Feedwater Water (AFW) System, Condenser and Condenser Air Removal System, and Circulating Water System (CWS) to include block diagrams, major components, functions and locations, process flow paths, importance to plant safety and relationship with other plant systems.

Safety Systems: provides instruction in Chemical and Volume Control System (CVCS), Reactor Makeup Water System, Residual Heat Removal (RHR) System, Emergency Core Cooling System (ECCS), Component Cooling Water (CCW) System, and Auxiliary Salt Water (ASW) System to include purpose, block diagrams, major components, functions and locations, process flow paths, and importance to plant safety and radioactive containment, relationship with other plant systems and the physical connections and/or cause effect relationships between the Fire Water System and the Centrifugal Charging Pumps (CCPs).

Ventilation and Control Systems: provides instruction in Auxiliary Building Ventilation System, Control Room Ventilation System, Fuel Handling Building Ventilation System, Rod Control System, and Main Feedwater Control System to include purpose, block diagrams, major components, functions and locations, process flow paths, Control Room Ventilation System alignments, and importance to plant safety and radioactive containment, and relationship with other plant systems.

Electrical Systems: provides instruction in the Plant Electrical System, Main Generator and related equipment, and the DG System to include purpose, block diagrams, major components, functions and locations, process flow paths, Control Room Ventilation System alignments, and importance to plant safety and radioactive containment, and relationship with other plant systems.

Plant Protective Systems: provides instruction in Reactor Protections System (RPS), Eagle 21 and Solid State Protection Systems (SSPS), Nuclear Instrumentation (NI) Systems, Incore Instrument Systems, DC Power System, and Instrument AC System to include purpose, block diagrams, major components, functions and locations, process flow paths, importance to plant safety and radioactive containment, and relationship with other plant systems.

Miscellaneous Systems: provides instruction in Liquid Radwaste Systems, Gaseous Radwaste System (GRS), Service Cooling Water (SWC) System, Fire Detection System, Cardox System and Fire Water System. Areas covered include purpose of system, block diagram, importance to plant safety and/or radioactive containment, basic interrelationship between other systems, major components, and specific area/and or components of each system are discussed.

I&C Fundamentals: Provides instruction in the following topics:

Electrical Safety: provides instruction in the responsibilities of employees, electrical definitions associated with the Electrical Safety Program Procedure OM6.ID12, the protection boundaries for shock and flash hazards and the proper Personal Protective Equipment (PPE) requirements, safety requirements and concerns of specific technical areas, the attitude and the key physical habits you should develop to safely work on energized equipment/circuits, and the use and care of rubber protective tools associated with electrical safety.

Basic Test Equipment Fundamentals: provides instruction in M&TE definition, concepts with test equipment hierarchy, how used to perform an instrument calibration, identify terms and concepts, determine cal status and restrictions associated with test equipment with special use labels, interpret restrictions associated with test equipment, test equipment checkout process during and after normal working hours, restrictions associated with test equipment control, and determine requirements for use and control of M&TE from control references.

Basic Electronic Test Equipment: provides instruction in purpose and capability of Fluke digital multimeter to include purpose/function of controls, connections, indicators and adjustments, process for obtaining resistance, voltage or current measurements, precautions and limitations, interpret info in site references associated with Ronan calibrator and Omnilight recorder, and applying human performance concepts.

Basic Specialized Test Equipment: provides instruction in purpose and major components, operational features of digital o-scope, probes, determining electrical measurements waveform, Tektronix digital o-scope, Time Domain Reflectometer, determine cable condition from display, interpret info in site references associated with Tektronix TDR, interpret info in site references associated with Hewlett Packard function generator, and applying human performance concepts.

DC Electronics: Computer based training with one lesson that provides instruction in:

DC Fundamentals:

Unit 1 – Trainer Familiarization
Unit 2 – Safety
Unit 3 – Electronic Quantities
Unit 4 – DC Power Sources
Unit 5 – Switches and Switching Concepts
Unit 6 – Ohm's Law
Unit 7 – Series Resistive Circuits
Unit 8 – Parallel Resistive Circuits
Unit 9 – Series/Parallel Resistive Circuits
Unit 10 – Power in DC Circuits
Unit 11 – Potentiometers and Rheostats
Unit 12 – Voltage and Current Divider Circuits
Unit 13 – Direct Current Meters

AC Electronics: Computer based training with one lesson that provides instruction in:

AC1 Fundamentals :

Unit 1 – The AC Waveform Generator
Unit 2 – AC Measurements
Unit 3 – Inductance
Unit 4 – Inductive Reactance
Unit 5 – Transformers
Unit 6 – Capacitance
Unit 7 – Capacitive Reactance
Unit 8 – Time Constants

Semiconductors: Computer based training with one lesson that provides instruction in:

Semiconductor Fundamentals:

Unit 1 – Introduction to Semiconductors
Unit 2 – Diodes and Half-Wave Rectification
Unit 3 – Full-Wave Rectification and Filtering
Unit 4 – Diode Wave Shaping and Zener Regulation
Unit 5 – Transistor Junctions & PNP DC BIAS
Unit 6 – Transistor Load Lines and Gain

Electronic Circuits: Computer based training with seven lessons that provide instruction in:

Transistor Amplifier Circuits:

Unit 1 – Introduction to Transistor Amplifiers
Unit 2 – Common Base Circuit
Unit 3 – Common Emitter Circuit
Unit 4 – Common Collector Circuit
Unit 5 – Bias Stabilization
Unit 6 – Transistor Specification Sheet
Unit 7 – RC Coupling
Unit 8 – Transformer Coupling
Unit 9 – Direct Coupling

Transistor Power Amplifiers:

Unit 1 – Circuit Board Familiarization
Unit 2 – Single-ended Power Amplifier
Unit 3 – Phase Splitter
Unit 4 – The Push-pull Power Amplifier
Unit 5 – The Complementary Power Amplifier
Unit 6 – The Darlington Pair

Transistor Feedback Circuits:

Unit 1 – Introduction to the Circuit Board
Unit 2 – Series Feedback
Unit 3 – Shunt Feedback
Unit 4 – Multistage Amplifier Feedback
Unit 5 – Differential Amplifiers

Power Supply Regulators:

Unit 1 – Circuit Board Familiarization
Unit 2 – Shunt Voltage Regulator
Unit 3 – Series Voltage Regulator
Unit 4 – Voltage Feedback Regulation
Unit 5 – Current Regulator
Unit 6 – Three-Pin IC Regulator
Unit 7 – DC to DC Converter

FET Fundamentals:

Unit 1 – Circuit Board Familiarization
Unit 2 – Junction FETS
Unit 3 – JFET Amplifier
Unit 4 – JFET Current Source
Unit 5 – Dual Gate MOSFET
Unit 6 – Unijunction Transistors
Unit 7 – Hartley and Colpits Oscillators 5
Unit 8 – Transducers

Operational Amplifiers fundamentals:

Unit 1 – The Operational Amplifier
Unit 2 – The Inverting Amplifier
Unit 3 – The Noninverting Amplifier
Unit 4 – The Voltage Follower
Unit 5 – The Inverting Summer
Unit 6 – The Noninverting Summing Amplifier
Unit 7 – The Difference Amplifier
Unit 8 – Voltage Comparators

Transducer Fundamentals:

Unit 1 – Familiarization
Unit 2 – IC Temperature Transducer
Unit 3 – The Thermistor
Unit 4 – The RTD
Unit 5 – The Thermocouple
Unit 6 – The Capacitance Sensor
Unit 7 – The Strain Gauge
Unit 8 – Ultrasonic Transducers
Unit 9 – The Infrared Controller
Unit 10 – Computer Interfacing

Basic Digital Electronics: Computer based training with one lesson that provides instruction in:

Digital Logic Fundamentals:

Unit 1 – Introduction to the Circuit Board
Unit 2 – Fundamental Logic Elements
Unit 3 – Exclusive-OR/NOR Gates
Unit 4 – Open Collector and Other TTL Gates
Unit 5 – Flip-Flops
Unit 6 – JK Flip-Flop
Unit 7 – Tri-State Output
Unit 8 – TTL and CMOS Comparison
Unit 9 – Data Bus Control

Advanced Digital Electronics: Computer based training with two lessons that provide instruction in:

Digital Circuit Fundamentals 1:

Unit 1 – Circuit Board Introduction
Unit 2 – Asynchronous Ripple Counter
Unit 3 – Synchronous Counter
Unit 4 – 4-BIT Shift Register
Unit 5 – 4-BIT Adder
Unit 6 – 4-BIT Comparator

Digital Circuit Fundamentals 2:

Unit 1 – 1 Circuit Board Familiarization
Unit 2 – Decoder and Priority Encoder
Unit 3 – ADC and DAC Operation
Unit 4 – Multiplexer and Demultiplexer
Unit 5 – 7-Segment Driver/Display
Unit 6 – Parity Generator/Checker

Microprocessor Basics: provides instruction in definition of terms, converting digital units, use of logic circuits, truth tables, flip flop operation, storage and memory, interconnections within a microprocessor, bus types and functions, and identifying the different types of CPU's used at DCPP and their differences.

Basic Physical Test Equipment: provides instruction in analog pressure gauge purpose and capability, construction and operation, process to calibrate, interpret info in site references associated with Heise/Mensor pressure gauge, requirements to select replacement bolt or fastener, how fasteners are torqued and commonly encountered problems during torquing, use and operation of torque wrenches and accessories, and applying human performance concepts.

I&C Print Reading: provides instruction in major features, classifications, document control, types of drawings, PIMS, use of PG&E programs to support maintenance activities, circuit numbers and equipment location codes, interpreting a DCPP print for circuit operation, applying human performance concepts to print reading.

Systematic Approach to I&C Troubleshooting: provides instruction in the seven step procedure, equipment failure, precautions, site references, electrical safety precautions, failure analysis, operability tests, indications of failure, precautions to minimize static electricity damage, effects of site requirements concerning minor maintenance work orders affects on troubleshooting.

I&C Basic Technician Qualifications:

Provides instruction in the following topics:

Basic Soldering and Circuit Board Repair for Electronics: provides instruction in soldering, soldering preparations, procedures, component replacement methods, and printed circuit board repair techniques. Lab portion provides familiarization for soldering electrical and electronic components.

Control Power Splices and Terminations: provides instruction in conductors and connectors, terms and definitions, preparation and fabrication, selecting terminations, site information available in termination references, using site references to determine requirements to fabricate a connection. Lab portion provides familiarization for making control power splices and terminations.

Tubing and Fittings: provides instruction in fabricating fittings, bending tubing, tube cutting, bending and de-burring tools, Swagelok installation, tightening, re-tightening and gap measurement common errors, safety considerations, fittings used at DCPP. Lab portion provides familiarization for bending, installing, removing, and leak checking instrument tubing and fittings.

Measurement Fundamentals: provides instruction in identifying components within an instrument channel and their functions, identifying terms and definitions, interpreting linear, log, and square root scales, determining input and output values for a five-point calibration and conditions that may require an instrument to be calibrated.

Temperature Sensors: provides instruction in fundamental temperature concepts, temperature sensors, operating principles, thermocouples, RTD, thermistor and industry events. During lab, utilizing Hart dry-well calibrator and Omega digital calibrator, calibrating bimetallic temperature sensor and bulb temperature switch, and checking a thermocouple and RTD.

Pressure and Flow Sensors: provides instruction in fundamental pressure concepts, pressure references, fluid flow and flow through a restriction, Bernoulli's equation, types of flow sensors, analog pressure gauge, calibrating an analog pressure gauge. Lab portion provides familiarization for calibrating plant pressure gauges, D/P indicating switch and vacuum or pressure switch.

Level Sensors: provides instruction in principles of sightglass operation, concepts associated with buoyancy, theory of operation of ball-float detectors to include the Magnetrol level switch, construction and theory of operation of a displacer level detector, process to adjust a buoyancy level sensor, concepts of hydrostatic pressure and density affects on level measurement, and the construction and theory of operation of a bubbler level detector. Lab portion provides familiarization for checking a float sensor.

Pneumatic Instruments: provides instruction in pressure concepts, definitions, Instrument Air System operation pneumatic signal transmission, links and levers, specialized components, flapper-nozzle assembly, pilot valve, pneumatic relay, self-balance pneumatic transmitter, moment-balance pneumatic transmitter, force-balance pneumatic transmitter and pneumatic pressure transmitters, problems and safety issues maintenance on pneumatic instruments. Lab portion provides familiarization for calibrating a pneumatic temperature, pressure or flow transmitter.

Electronic Devices: provides instruction in terminology, purposes and functions, signal ranges, hydrostatic static principles and applications, site specific level measurement systems, safety precautions, calibration procedures and optimization, configuration control, site references for maintenance and calibration, preventive and corrective maintenance precautions. Lab portion provides familiarization for calibrating the following instruments: R/I, I/I, bistable/comparator, I/P, Rosemount dP transmitter, Barton dP transmitter, and DPU and sensing line fill and vent.

Environmentally Qualified Equipment: provides instruction in defining EQ, basic categories of instruments subject to EQ requirements, how an Important to Safety device may be exempt from EQ requirements, environmental factors, the EQ status of an instrument, and identifying requirements for working on EQ devices. Lab portion provides familiarization for EQ maintenance on Rosemount and Barton Transmitters.

Plant Recorders: provides instruction in purpose, classification and operational features of DCPP recorders, construction and theory, DCPP specific recorders. Lab portion provides familiarization for calibrating analog electronic and digital recorders.

Controller Fundamentals: provides instruction in terms and definitions, operational characteristics, feedback, feedforward, cascade and ratio control, , proportional band and proportional control action, offset, integral control action, PID controller response to error signal, types of controller tuning methods, and industry events.

Pneumatic Controllers: provides instruction in elementary operation of a pneumatic controller to include proportional, reset, and derivative action, transmission of a pneumatic signal, construction and operation of Fisher LevelTrol, Foxboro 43A, and Fisher 4150/4160 pneumatic controllers, how maintenance can affect loop operation, use of site references to obtain information, industry events associated with controllers in the nuclear industry and how using the two-minute rule improves human performance techniques. Lab portion provides familiarization for calibrating a pneumatic proportional plus reset controller.

Electronic Controllers: provides instruction in amplifiers, op amps used in P, I, and D control actions, site references for maintenance and calibration, operational characteristics, functions and major components of programmable controller, input/output modules, symbols for discrete field devices, analog input/output module, ladder and relay logic diagrams, programmable timer and counter, site references for maintenance and calibration, and industry events. Lab portion provides familiarization for calibrating an electronic PID controller.

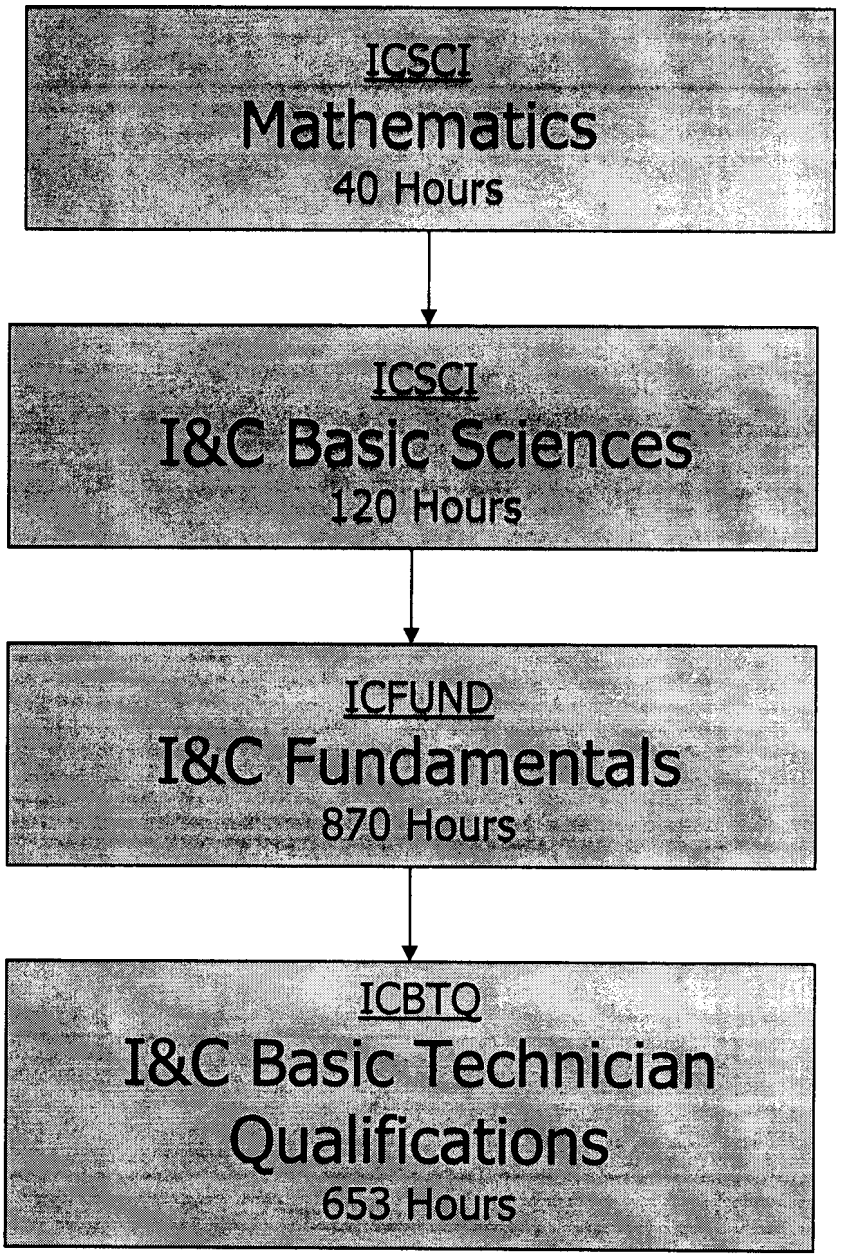
Control Valves and Actuators: provides instruction in the purpose and definitions for control valves, construction of pneumatic instrument mechanical devices, pneumatic control valve, construction and theory of operation of: flapper nozzle amplifier; pneumatic pilot; and pneumatic relay, valve travel adjustments, bench set, industry events associated with control valves in the nuclear industry, Fisher Type 3582 positioner, limit switch adjustments and the features of the AirCet test equipment.

Analytical Measurements: provides instruction in types and principles of operation of analytical instruments, sampling conditions, appropriate safety precautions, measuring pH, construction and operation of pH analyzers, conductivity measurement concepts, and dissolved oxygen sensor. Lab portion provides familiarization for calibrating pH analyzer and conductivity analyzers.

End of Section IV

SECTION V – Apprentice IR Program Map and Schedule

A. Program Map



B. General Program Schedule

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	495						600						665						690						690					
	30 hours during 4th quarter																													
ACADEMIC TRAINING																														
Mathematics		1 Week																												
I&C Basic Sciences			3 Weeks																											
I&C Fundamentals				21.75 Weeks																										
I&C Basic Tech Quals													15.33 Weeks																

End of Section V

SECTION VI – Training Records Management

Auditable records are required for documentation of training in support of the Instrument Repairman Apprentice Program. Training records will be established for each Apprentice candidate for both academic and OJT provided in accordance with TQ2.ID6, Training Records Management and TQ1.ID4, Non-Accredited Training Records.

A. Academic Training Courses

Each academic course taught will be documented with a Training Attendance Record. Training Attendance Record should include: Program/Course and Topic information, date of training, class number, lesson revision number and date, class title, number of class hours, instructor(s) signature(s), program coordinator signature, date student attended, student name, student identification, student signature, quiz, test, and/or exam score, as applicable. If a course is made up of multiple lessons (e.g., I&C Basic Sciences – Chemistry, Physics, etc.) a Training Attendance Record will be developed for each lesson.

B. On-The-Job Training –Qualification Book

Each Apprentice will be issued a Qualification Book upon his/her acceptance into the Apprentice Training Program. The Qualification Book consists of OJT tasks that will be completed and signed off during the 36-month apprenticeship. Each apprentice is responsible for obtaining his/her sign-offs by a qualified Journeyman OJT Trainer. It should be noted that obtaining a sign-off for completed OJT does not by itself fulfill the hourly requirements stipulated in Section D of this document. Nor does OJT sign-offs task qualify the apprentice.

It is recognized that academic and OJT, while vital to the learning process, are not by themselves a stand-alone methodology to completely train the apprentice in all the skills and knowledge necessary for Journeyman status. This program recognizes the importance of plant work and time-in-grade to complete a well-rounded training program.

Thus, OJT will be documented by the line organization in accordance with the hourly requirements of Section D, I. of this document. The forms provided in Attachment 5 and 6 will be used to maintain a record of hourly performance in the various subject areas covered by the OJT portion of the Apprentice Training Program. The Supervisor will verify OJT hours completed on a weekly basis. As progress through this training is achieved, the Supervisor will review and evaluate performance on each apprentice.

C. TPE Evaluation

Task Performance Evaluation (TPE) - Evaluation of the student's performance of a task under controlled conditions and measured against observable and quantifiable standards. TPE is the evaluation of those skills and knowledge performed during the OJT phase of apprentice training. Task qualification is accomplished with TPEs. Task qualification will not be granted until academic and OJT requirements are completed. TPEs will be documented in accordance with TQ2.ID4, Training Program Implementation.

End of Section VI

SECTION VII – Progress Documentation Procedures

A. Daily OJT Hours

Attachment 5 "Training Hours" column is the total hours required for the entire 30-month period for each of the items listed.

The required hours for each 6-month period are shown on Attachment 6, On-The-Job Training. The Apprentice should meet or exceed these times for each area.

OJT hours in the specified areas shown on Attachment 5, Daily OJT Hours, will be documented as follows:

The Apprentice will document hours spent in the non-shaded block of Attachment 5 for that date. The Journeyman who is assigned to work with the Apprentice will initial in the shaded block immediately below the hours marked to indicate that the time spent was acceptable. See example below.

(Portion of Attachment 5, Daily OJT Hours)

Item	Training Hours	Total Hours	Day of the Month				
			1	2	3	4	5
Pitot Tube	5				3		
					RG		
Volt Meter	7			1			2
				JT			RG
Ammeter	7					4	
						JT	

At the end of each month, the Apprentice will add the hours in each area and record the total time in the "Total Hours" column. See example below.

(Portion of Attachment 5, Daily OJT Hours)

Item	Training Hours	Total Hours	Day of the Month				
			1	2	3	4	5
Pitot Tube	5	3			3		
					RG		
Volt Meter	7	3		1			2
				JT			RG
Ammeter	7	5	1			4	
						JT	

The supervisor will review and initial at the bottom of each topic area as shown below.

(Portion of Attachment 5, Daily OJT Hours)

Item	Training Hours	Total Hours	Day of the Month				
				13	14	15	16
Pitot Tube	5	4			1		
					JT		
Volt Meter	7	5		1			1
				RG			RG
Ammeter	7	4					
Supervisor Review					RJT		

B. Total Hours

At the end of each month, the Apprentice will total the "Total Hours" column in Attachment 5 and insert this number in the "TOTAL HOURS FOR MONTH" on Attachment 5 and the "Actual Hours" block of the appropriate month on Attachment 6. When a 6-month training phase has been completed, he will total the hours listed in each month and put that number in the row below the required "Training Hours." The "Training Hours" are the minimum number of hours that must be completed at that time. The "Actual Hours" should equal or exceed the number in the "Training Hours."

Each month the Apprentice will shade in the "Time in Program" bar.

The supervisor will review and verify the hours and initial and date each month period. He will also review the "Actual Hours" at the end of each training period and initial in the shaded block below the recorded hours for that period.

The Machine Shop hours shown on the General Program Schedule are intended to provide hands-on training of various hand held power tools and those larger stationary tools such as drill press, bench grinder, wire wheel and others as determined by supervision. Training will include precision instruments such as dial micrometers and calipers. Hours will be documented on Attachment 5, Daily OJT Hours.

(Portion of Attachment 6, Master Assignment Chart)

Supervisor's Initials	RJT	RJT	RJT	RJT	RJT	RJT	RJT					
Date (Month and Year)	01/ 06	02/ 06	03/ 06	04/ 06	05/ 06	06/ 06		07/ 06				
Month	3			6					9			
Time in Program												
Program Period							1					

ON-THE-JOB TRAINING

Control System Equipment	Training Hours							225				
	Actual Hours	45	47	36	45	38	31	24 2	5 1			
	Supervisor Initials							RJT				
Recorders and Indicators	Training Hours							50				
	Actual Hours	6	8	10	8	11	8	51	8			
	Supervisor Initials							RJT				

Submit Attachments 5 and 6 and the Master Assignment Chart Review and Comments form on the following page to the Line Manager for his review and comment at the start of the seventh, thirteenth, nineteenth, twenty-fifth and thirtieth month. The Line Manager will forward the forms to the Division Personnel Department for their review and comment and return them to the plant prior to the end of the month. These forms will be filed in the Apprentice's training folder.

End of Section VII

MASTER ASSIGNMENT CHART REVIEW AND COMMENTS

Apprentice Name: _____ _____ _____
User ID Start Date

FIRST PERIOD REVIEW

Comment: _____

_____ _____ _____
(Signed) Line Manager Date

Comment: _____

_____ _____ _____
(Signed) Personnel Dept. Rep. Date

SECOND PERIOD REVIEW

Comment: _____

_____ _____ _____
(Signed) Plant Manager Date

Comment: _____

_____ _____ _____
(Signed) Personnel Dept. Rep. Date

THIRD PERIOD REVIEW

Comment: _____

_____ _____ _____
(Signed) Line Manager Date

Comment: _____

_____ _____ _____
(Signed) Personnel Dept. Rep. Date

FOURTH PERIOD REVIEW

Comment: _____

_____ _____ _____
(Signed) Line Manager Date

Comment: _____

_____ _____ _____
(Signed) Personnel Dept. Rep. Date

FIFTH PERIOD REVIEW

Comment: _____

_____ _____ _____
(Signed) Line Manager Date

Comment: _____

_____ _____ _____
(Signed) Personnel Dept. Rep. Date

Attachment 1 – Mathematics

COURSE ICSCI – MATHEMATICS

LESSONS: 1

TOTAL HOURS: 40

STUDENTS: 12

Lesson Number	Title	CR Hours
TBS01	Mathematics	40
	Total Hours	**40**

CR = Classroom

Attachment 2 – I&C Basic Sciences

COURSE ICSCI – I&C BASIC SCIENCES

LESSONS: 16

TOTAL HOURS: 120

STUDENTS: 12

Lesson Number	Title	CR Hours
MBS0100	Physics	5
MBS0200	Electrical Science	5
MBS0500	Heat Transfer and Fluid Flow	5
MBS0600	Fundamentals of Hydraulics and Pneumatics	6
MBS0700	Basic Chemistry	7
MBS0400	Basic Atomic and Nuclear Physics	6
MBS0300	Properties of Nuclear Plant Materials	6
MPS1	Reactor and Refueling Systems	80
MPS2	Primary Systems	
MPS3	Steam Systems	
MPS4	Feed Systems	
MPS5	Safety Systems	
MPS6	Ventilation and Control Systems	
MPS7	Electrical Systems	
MPS8	Plant Protective Systems	
MPS9	Miscellaneous Systems	
	Total Hours	**120**

CR = Classroom
MPS1-9 listed in MM Initial POI

Attachment 3 – I&C Fundamentals

COURSE ICFUND – I&C FUNDAMENTALS

LESSONS: 21

TOTAL HOURS: 870

STUDENTS: 12

Lesson Number	Title	Hours
ME000401	Electrical Safety – see EM program	5
IABFTE	Basic Test Equipment Fundamentals	10
IABETE	Basic Electronic Test Equipment	20
IABSTE	Basic Specialized Test Equipment	40
CBT* (IABDC)	DC Fundamentals	80
CBT* (IABAC)	AC1 Fundamentals	80
CBT* (IABSC)	Semiconductor Fundamentals	80
CBT* (IABEC)	Transistor Amplifier Circuits	45
	Transistor Power Amplifiers	35
	Transistor Feedback Circuits	40
	Power Supply Regulators	40
	FET Fundamentals	40
	Operational Amplifiers Fundamentals	50
	Transducer Fundamentals	35
CBT* (ICBDL)	Digital Logic Fundamentals	80
CBT* (ICADL)	Digital Circuit Fundamentals 1	30
	Digital Circuit Fundamentals 2	30
ICMB04	Microprocessors	40
IABPTE	Basic Physical Test Equipment	20
ICPR01	I&C Print Reading	40
IABTS	Systematic Approach to I&C Troubleshooting	30
CBT* - Completion of CBT lesson(s) provides credit for completion of the associated classroom presentation shown in ( ).	**Total Hours**	**870**

Attachment 4 – I&C Basic Technician Qualifications

COURSE ICBTQ – I&C BASIC TECHNICIAN QUALIFICATION

LESSONS: 16

TOTAL HOURS: 613

JPMs: 30

TOTAL JPM HOURS: 78

STUDENTS: 12

Lesson Number	Title	CR Hours	# JPMs /Time	JPM Hours
IACD01	Basic Soldering and Circuit Board Repair for Electronics	80	1 @ 12	12
IABCPT	Control Power Splices and Terminations	10	1 @ 2	2
IZAB010	Tubing and Fittings	5	1 @ 2	2
IAFA010	Measurement Fundamentals	20	–	–
IPSI01T	Temperature Sensors	20	4 @ 2	8
IPSI01PF	Pressure and Flow Sensors	40	2 @ 4, 1 @ 2	10
IPSI01L	Level Sensors	20	1 @ 2	2
IPSI02	Pneumatic Instruments	80	1 @ 2	2
IPSI03	Electronic Devices	88	6 @ 2, 1 @ 4	16
IZA	Environmentally Qualified Equipment	10	2 @ 2	4
IPSI04	Plant Recorders	40	1 @ 1, 1 @ 2	3
IPSI06C	Controller Fundamentals	40	–	–
IPSI06P	Pneumatic Controllers	40	1 @ 4	4
IPSI06E	Electronic Controllers	40	1 @ 3	3
IPSI07	Control Valves and Actuators	40	3 @ 2	6
IPSI09	Analytical Measurements	40	2 @ 2	4
	Total Hours	613	30 JPMs	78

CR = Classroom
JPM = Job Performance Measure

JPMs Associated with I&C Basic Technician Qualifications

Lesson	Title	JPM	Title	Hrs
IACD01	BASIC SOLDERING and CIRCUIT BOARD REPAIR FOR ELECTRONICS	IJP00A	Solder Electrical and Electronic Components	12

Lesson	Title	JPM	Title	Hrs
IABCPT	CONTROL POWER SPLICES and TERMINATIONS	IJP00C	Control Power Splices and Terminations	2

Lesson	Title	JPM	Title	Hrs
IZAB010	TUBING and FITTINGS	IJP00B	Bend, Install, Remove, and Leak Check Instrument Tubing and Fittings	2

Lesson	Title	JPM	Title	Hrs
IPSI01T	TEMPERATURE SENSORS	IJP0504A	Check/Replace a Thermocouple	2
		IJP0505	Bulb Temperature Switch	2
		IJP0506	Check an RTD	2
		IJP0508	Bimetallic Temperature Sensor PM	2

Lesson	Title	JPM	Title	Hrs
IPSI01PF	PRESSURE AND FLOW SENSORS	IJP0405	Calibrate a Plant Pressure Gauge	4
		IJP0701	Calibrate D/P Indicating Switch	4
		IJP0702	Vacuum or Pressure Switch PM	2

Lesson	Title	JPM	Title	Hrs
IPSI01L	LEVEL SENSORS	IJP0501	Check a Float Sensor	2

Lesson	Title	JPM	Title	Hrs
IPSI02	PNEUMATIC INSTRUMENTS	IJP0200	Calibrate a Pneumatic Temperature, Pressure or Flow Transmitter	2

Lesson	Title	JPM	Title	Hrs
IPSI03	ELECTRONIC DEVICES	IJP0707	Calibrate R/I Transmitter	2
		IJP0709	Calibrate I/I Module	2
		IJP0710	Calibrate Bistable/Comparator Module	2
		IJP0808A	Calibrate I/P Converter	2
		IJP0713A	Calibrate a Rosemount 1151, 1152, 1153, or 1154 DP Transmitter	2
		IJP0714	DPU and Sensing Line Fill and Vent	2
		IJP0715A	Calibrate a Barton DP Transmitter	4

Lesson	Title	JPM	Title	Hrs
IZA	ENVIRONMENTALLY QUALIFIED EQUIPMENT	IJP2804	EQ Maintenance on a Rosemount Transmitter	2
		IJP2805	EQ Maintenance on a Barton Transmitter	2

Lesson	Title	JPM	Title	Hrs
IPSI04	PLANT RECORDERS	IJP0413	Calibrate an Analog Electronic Recorder	1
		IJP0415	Calibrate a Digital Recorder	2

Lesson	Title	JPM	Title	Hrs
IPSI06P	PNEUMATIC CONTROLLERS	IJP1009	Calibrate a Pneumatic Proportional Plus Reset Controller	4

Lesson	Title	JPM	Title	Hrs
IPSI06E	ELECTRONIC CONTROLLERS	IJP1011	Calibrate an Electronic Controller (PID)	3

Lesson	Title	JPM	Title	Hrs
IPSI07	CONTROL VALVES and ACTUA	IJP0906	Calibrate Valve Stroke	2
		IJP0916	Calibrate a Valve Positioner	2
		IJP0926	Calibrate Valve Position Switches	2

Lesson	Title	JPM	Title	Hrs
IPSI09	ANALYTICAL MEASUREMENTS	IJP1101	Calibrate a pH Analyzer	2
		IJP1102	Calibrate a Conductivity Analyzer	2

PIMS NO.:

TITLE: APPRENTICE INSTRUMENT REPAIRMAN PROGRAM OF INSTRUCTION

Attachment S - Daily OJT Hours

NAME _____ USER ID _____ PLANT _____ MONTH/YEAR _____

CONTROL SYSTEM EQUIPMENT — TOTAL HOURS FOR MONTH — DAY OF THE MONTH

Item	Training Hours	Total Hours	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29		
Fluid Flow Meter	100																																
Air Flow Meter	50																																
Relays	100																																
Recorders	60																																
Modifiers	120																																
Float/Displacer Sensors	50																																
Transmitters	50																																
Supervisor Review																																	

RCA WORK PRACTICES * — TOTAL HOURS FOR MONTH — DAY OF THE MONTH

Item	Training Hours	Total Hours	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29		
A Transmitter Calibration*	60																																
RCA Gauge Calibration*	60																																
A Maintenance Activities*	60																																
Supervisor Review*																																	

* - OCPP Only

Attachment 5 - Daily O/T Hours (Page 2 of 5)

NAME _____ USER ID _____ PLANT _____ MONTH/YEAR _____

MISCELLANEOUS EQUIPMENT TOTAL HOURS FOR MONTH

Item	Training Hours	Total Hours	DAY OF THE MONTH 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Alarms	30																												
pH Measurement	40																												
Conductivity Measurement	40																												
Gauges/Switches	60																												
Temperature Sensors	100																												
Pressure Sensors	100																												
Hydrogen Systems	30																												
Hydrazine Systems	10																												
Control Power Splices & Terminations	30																												
Flow Indicators	35																												
Differential Indicators	40																												
Tubing and Fittings	30																												
EO Transmitter Maintenance	25																												
Supervisor Review																													

Attachment 5 - Daily OJT Hours (Page 2 of 6)

NAME _____ USER ID _____ PLANT _____ MONTH/YEAR _____

TEST EQUIPMENT _____ TOTAL HOURS FOR MONTH _____

Item	Training Hours	Total Hours	DAY OF THE MONTH 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
D.W. Gage & Tester	60																												
Micrometers	4																												
Capacitance Checker	10																												
Inductance Checker	10																												
Ohm Meter	40																												
Volt Meter	40																												
Ammeter	40																												
Pico Ammeter	10																												
High Resistance Meter	10																												
Wheatstone Bridge	10																												
Signal Generator	30																												
Oscilloscope	40																												
Time Domain Reflectometer	15																												
Vibration Meter	10																												
Tachometer	8																												
Psychrometer	10																												
Gas Analyzer	10																												
Supervisor Review																													

Attachment 5 - Daily OJT Hours (Page 4 of 6)

NAME _____ USER ID _____ PLANT _____ MONTH/YEAR _____

CONTROLLERS TOTAL HOURS FOR MONTH

Item	Training Hours	Total Hours	DAY OF THE MONTH 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
On-Off	20																															
[illegible] P/P/PID	30																															
[illegible] P/P/PID	30																															
[illegible] P/P/PID	30																															
Controller Tuning	40																															
Supervisor Review																																

CONTROL VALVES & INDICATORS TOTAL HOURS FOR MONTH

Item	Training Hours	Total Hours	DAY OF THE MONTH 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
AOV	30																											
Solenoid Valve	30																											
Hydraulic (EH) Valve	30																											
Positioners	40																											
Regulator/Relief Valves	30																											
Instrument (Dropper) Valves	10																											
Valve Position Indicators	30																											
Limit Switches	30																											
Supervisor Review																												

Attachment 5 - Daily OJT Hours (Page 5 of 6)

NAME _____ USER ID _____ PLANT _____ MONTH/YEAR _____

SUPERVISORY INSTRUMENTS — TOTAL HOURS FOR MONTH

Item	Training Hours	Total Hours	DAY OF THE MONTH 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Vibration	40																											
Eccentricity	65																											
Speed and Cam	65																											
Expansion	65																											
Gas Analyzers	80																											
Rotor Position	95																											
Plant Data Network & Data Recording	10																											
Supervisor Review																												

BOILER SYSTEM EQUIPMENT — TOTAL HOURS FOR MONTH

Item	Training Hours	Total Hours	DAY OF THE MONTH 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Gas Analyzers*	80																														
[illegible] Controls*	160																														
[illegible]perature Controls*	200																														
[illegible]oduction Controls*	480																														
Supervisor Review*																															

* - Will SCPP

Attachment 5 - Daily OJT Hours (Page 6 of 8)

RECORDERS AND INDICATORS TOTAL HOURS FOR MONTH

Item	Training Hours	Total Hours	DAY OF THE MONTH 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Analog Recorders	20																												
Digital Recorders	20																												
Multi-Pen Recorders	20																												
Control/Alarms Output	40																												
Analog Meters	20																												
Digital Meters	20																												
Supervisor Review																													

MACHINE SHOP TOOLS TOTAL HOURS FOR MONTH

Item	Training Hours	Total Hours	DAY OF THE MONTH 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Hand-Held Power Tools	15																												
Stationary Power Tools	10																												
Precision Instruments	5																												
Supervisor Review																													

REMARKS BY SUPERVISOR: _____

(Signed) Supervisor _____

(Signed) Apprentice _____

(Signed) Line Manager _____

Attachment 6 - Master Assignment Chart

Name_____ USER ID _____ Plant_____ Starting Date_____